1985

The 'delusion Of Comprehension' Phenomena In Young Children: An Instructional Approach To Promoting Listening Comprehension Monitoring Capabilities In Grade Three Children

Darlene Judith Elliott-faust

THE 'DELUSION OF COMPREHENSION' PHENOMENA IN YOUNG CHILDREN: AN INSTRUCTIONAL APPROACH TO PROMOTING LISTENING COMPREHENSION MONITORING CAPABILITIES IN GRADE THREE CHILDREN

by
Darlene Judith Elliott-Faust

Department of Psychology

Submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

Faculty of Graduate Studies
The University of Western Ontario
London, Ontario
November, 1984

ABSTRACT

Listening comprehension monitoring refers to the skills involved in assessing one's level of understanding of orally presented material. Markman (1979) has reported that grade three children are inefficient at detecting inconsistencies in orally presented expository material --they indicate they understand material that is incomprehensible. Markman and Gorin (1981) have reported that providing grade three children with an appropriate standard for evaluating their comprehension enhances their listening comprehension monitoring performances on inconsistent passages to a moderate degree. The focus of the present research was on designing an instructional program for third grade children to promote the acquisition and maintenance of efficient listening comprehension monitoring performances. Based on a conceptualization of the role of metacognition in efficient performances on cognitive tasks, and extensive pilot work with adults and children, the following three task-specific strategies were hypothesized to be critical in detecting inconsistencies in oral passages: 1) a comparison strategy which involves comparing incoming sentences to determine if they are consistent; 2) a monitoring strategy which involves checking back to determine if 'previously heard' information is consistent with 'just heard' information; and 3) a self-instruction training approach (Meichenbaum & Goodman, 1971) which promotes the use of a structured problem-solving approach to the task, and facilitates maintenance. It was hypothesized that grade three children provided with an appropriate standard of evaluation in conjunction with this three-tiered instructional program would demonstrate superior listening comprehension

monitoring performances relative to children simply provided with the standard of evaluation. One hundred and ninety-two grade three children participated in the present study and were randomly assigned to one of eight experimental conditions. These experimental groups represented various combinations of instructional components ranging from posttest only control to a group provided with the appropriate standard of evaluation plus the three-tiered instructional training program. Children were asked to judge the comprehensibility of three inconsistent and one consistent passage both immediately following control group or training manipulations, and six to eight days later. The results of the present research led to the following conclusions: 1) in replication of Markman and Gorin's (1981) finding, the provision of an appropriate standard of evaluation enhances the listening comprehension monitoring of grade three children relative to uninformed presentation of the passages (i.e., no training and exposure to materials only); 2) providing a standard and exposure to the training passages was no more effective than simple provision of the standard, and may impede performance; and 3) while provision of a standard and training in the comparison and monitoring strategies is sufficient to promote optimal performance at immediate testing, the inclusion of a self-instruction component facilitated maintenance at delayed testing. Information collected during a posttask interview at both testing times provided additional support for the original hypothesis that provision of an appropriate standard, plus training in the cognitive strategies that underlie the application of the standard, are sufficient to produce efficient listening comprehension monitoring. Future research directions in the areas of generalization of comprehension monitoring skills, and applications to learning disabled populations are discussed.

DEDICATION

I would like to dedicate this dissertation to my parents and my husband, Robert, for their unwavering confidence that I would attain this goal.

ACKNOWLEDGEMENTS

I am grateful for the contributions of a number of individuals during the process of completing this dissertation. First I would like to express my sincere appreciation to my advisor, Dr. Michael Pressley, for his support, guidance and unwavering confidence. Also I would like to thank Drs. Marg Hearn, Cynthia Miller, Albert Katz, Harry Murray, Peter Denny, Joy Elder, and particularly Dave Pederson, for their helpful comments and suggestions at various points during the planning and writing of the dissertation.

I would also like to thank my friends Julia O'Sullivan and Sue Bryant for their encouragement and support throughout each phase of the research. A special thank you to my good friend Cathy Koverola whose friendship sustained me through the dissertation process.

A sincere thank you to Linda Tupholme for her excellent work in deciphering my writing and instructions, and typing the manuscript.

I would like to thank all the adults who participated in the pilot study, and the grade three children and teachers from the following London elementary schools for their participation in my research: Bryon Southwood Public School, Emily Carr Public School, Evelyn Harrison Public School, Lord Nelson Public School, Princess Elizabeth Public School, Northridge Public School, Arthur Stringer Public School, and Cleardale Public School. A final thank you to Dr. Richard Stennett of the London Board of Education for his cooperation and assistance in securing schools to conduct the research.

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

> Part of being a good student is learning to be aware of...[the] state of one's own mind and the degree of one's own understanding. The good student may be the one who often says he does not understand, simply because he keeps a constant check on his understanding. The poor student, who does not, so to speak, watch himself trying to understand, does not know most of the time whether he understands or not. Thus the problem is not to get students to ask what they don't know; the problem is to make them aware of the difference between what they know and what they don't. (Holt, 1964, pp. 16-17)

Two decades after Holt wrote this passage, research from diverse areas of cognitive-developmental inquiry including: memory (e.g., Flavell, Freidrichs, & Hoyt, 1970); reading (e.g., Garner & Taylor, 1982); referential communication (e.g., Flavell, Speer, Green, & August, 1981); and listening comprehension (e.g., Markman, 1977), has provided converging evidence that young children and less successful students (e.g., poor readers, retarded children) are generally unaware of the state of their knowledge. In Holt's (1964) terms, they are unable to distinguish between what they know and what they do not know. For example, they cannot assess when items on a recall task are learned sufficiently to ensure errorless recall (Flavell et al., 1970); when a speaker's message contains ambiguous references so that any choice among referents would be arbitrary (Flavell et al., 1981); or when reading passages (Garner & Taylor, 1982) or oral instructions (Markman, 1977) contain omissions or distortions of meaning so as to render them incomprehensible, etc. Presumably, this lack of awareness of one's state of knowing precludes strategic action (e.g., further study of unlearned items, requesting classification of an unclear message, re-reading a passage, or re-checking instructions for omissions) aimed at correcting any gaps in knowledge or understanding, with resulting negative consequences for learning.

This concept of "knowing about knowing" (Brown, 1978) has been termed metacognition in the psychological literature. When Flavell (1976) first introduced this term he defined it as knowledge and awareness of one's cognitive processes. Meichenbaum and Asarnow (1979) provide the following conceptualization of metacognition: "[it refers to the] subject's awareness of his own cognitive machinery and the way this machinery works" (p. 24). Implicit in these definitions is a distinction between knowledge of cognitive resources and processes, the monitoring and regulation of ongoing cognitive activity, and cognitive activity *per se*. The focus of the present research is on the monitoring/regulating function of metacognition. More specifically, the research focuses on the ability of young children to monitor their understanding of orally presented expository material, or their listening comprehension monitoring abilities.

Previous descriptive-developmental research in this area, while sparse, has provided evidence that even as late as the sixth grade children are deficient in their abilities to monitor their comprehension of orally presented expository material (Markman, 1977, 1979; Markman &

Gorin, 1981). However, the research conducted to date has provided little beyond a demonstration of deficiencies of young children in yet another cognitive domain. Pressing questions remain unanswered including: (1) What are the cognitive processes involved in listening comprehension monitoring?; (2) Is it possible to instruct young children in these processes to promote the acquisition and maintenance of effective comprehension monitoring skills?

The research to be described on the following pages was undertaken in an attempt to address these questions. Prior to presenting these studies, however, it is necessary to survey the following theoretical and empirical influences from which the present research grew: 1) the concept of metacognition as it relates to competent performances on cognitive tasks; 2) a review and synthesis of the comprehension monitoring literature from the domains of listening comprehension, referential communication, and reading comprehension; and 3) relevant issues in conducting instructional research.

Metacognition

A basic theoretical assumption of the present paper, and one that is receiving increasing empirical support (see Pressley, Borkowski, & O'Sullivan (in press a, b) for a review), is that metacognition plays a pivotal role in sophisticated cognitive performance, and that the poorer performances of young children on cognitive tasks can be attributed to deficiencies in metacognition (Brown, 1978; Flavell, 1978, 1979, 1981, in press; Pressley et al., in press a, b). An additional theoretical assumption is that one can improve the performances of young children on cognitive tasks by increasing their understanding of the nature of metacognition, and the interrelationship of metacognitive components during performances on cognitive tasks. This hypothesis is consistent with the metacognitive position that what one knows about cognition directs cognitive action (Schneider, in press). As with other cognitive pursuits, the ability to monitor one's comprehension of orally presented material requires the invocation and orchestration of various cognitive processes which are subsumed under the rubric of metacognition. Therefore, the following model of metacognition is presented to provide a scaffold for the proposed research aimed at enhancing the listening comprehension monitoring performances of young children.

When Flavell (1976) originally introduced the term metacognition into the psychological literature, he provided the following definition:

> "Metacognition" refers to one's knowledge concerning one's own cognitive processes and products or anything related to them, e.g., the learning related properties of information or data. For example, I am engaging in metacognition... if I notice that I am having more trouble learning A than B; if it strikes me that I should double check C before accepting it as fact; if it occurs to me that I had better scrutinize each and every alternative in any

> multiple-choice type task situation before deciding which is the best one; if I sense that I had better make a note of D because I may forget it...Metacognition refers, among other things, to active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects on which they bear, usually in the service of some concrete goal or objective. (p. 232)

Flavell and his colleagues in their original and subsequent writings on this topic (e.g., Flavell, 1979, 1981; Flavell & Wellman, 1977), as well as other investigators and researchers in this area (e.g., Brown, 1978), treat metacognition as a global, amorphous concept consisting of both knowledge and awareness of cognitive processes, and imbued with functions (e.g., orchestration of cognitive processes) typically assigned to the executive in models of intelligence (e.g., Borkowski, in press; Campione & Brown, 1978). I will provide a more clearly delineated discussion of the components of metacognition, and their relationship to sophisticated cognitive performance. This discussion draws heavily on both Flavell's (1979, 1981, in press) theorizing about the nature of metacognition, as well as the writings of other investigators in this area (e.g., Brown, 1978; Pressley, Borkowski and O'Sullivan, in press a, b).

Basically, metacognition will be conceptualized as composed of the following increasingly sophisticated and complex levels: 1) knowledge of cognitive processes which includes both Basic Cognitive Strategy Representations and Metacognitive Knowledge about Cognitive Processes; 2) awareness of cognitive processes which includes Metacognitive Strategies that monitor and regulate ongoing cognitive activity; and 3) Higher Order Coordinating Strategies that oversee and integrate the application of cognitive and metacognitive strategies during a cognitive endeavor. In discussing the content of these levels of metacognition, a sophisticated cognizer will be assumed.

The most fundamental or basic elements of this proposed model of metacognition are the learner's Basic Cognitive Strategy Representations (Pressley et al., in press, b). The sophisticated cognizer has available to her/him a repertoire of cognitive strategies including memory strategies (e.g., imagery, rehearsal), strategies for attending (e.g., orienting to the information source) reading strategies (e.g., word decoding) etc. A strategy is defined as a specific plan of action undertaken to achieve a specific cognitive goal (i.e., rehearsing to remember a list of words) (Brown, 1975). At this level of metacognition all that is assumed to exist is a representation of the strategy in memory, and knowledge concerning the mechanics of executing the strategy (i.e., the "how" of performing the strategy) (Pressley et al., in press, b).

The next level of metacognition consists of Metacognitive Knowledge about Cognitive Processes. Flavell (1979) stated that metacognitive knowledge "consists primarily of knowledge or beliefs about what factors or variables act and interact to affect the course and outcome of cognitive enterprises" (p. 907). As delineated by Flavell, the major categories of factors or variables that comprise metacognitive knowledge include knowledge relevant to:

(1) person variables including: a) knowledge pertaining to intraindividual and interindividual cognitive traits (e.g., I am better at remembering visually presented material, while my mother is better at remembering auditory material), and universals about humans as cognizers (e.g., it is impossible for anyone to remember 1000 unrelated items in a list); and b) interpretation of personal experience (i.e., metacognitive experiences) while performing cognitive activities (e.g., a feeling that something is on the tip of the tongue, sensations of not understanding, etc.).

(2) task variables which affect the difficulty level of the task including input and output demands (e.g., it is easier to learn a categorized list of items than one arranged in a random order; verbatim recall is more difficult than gist recall).

(3) strategy variables which includes knowledge germane to the usage of specific cognitive strategies (e.g., an imagery based strategy is very effective in learning a list of nouns). In a recent paper, Pressley et al. (in press, b) have provided a taxonomy of this strategy knowledge. The component of their taxonomy that is most relevant to the present discussion is termed Specific Strategy Knowledge. This Specific Strategy Knowledge is assumed to include knowledge of when, where and why a specific cognitive strategy can be used, as well as how it can be modified to meet new task demands (Pressley et al., in press, b). In addition, the Specific Strategy Knowledge is assumed to include knowledge of how the implementation of the cognitive strategy can be

monitored and regulated (metacognitive strategies to be discussed subsequently).

Flavell (1979) states that the bulk of metacognitive knowledge actually consists of knowledge of interactions between the categories of person, task and strategy (e.g., I am better at remembering information for a short essay test if I make up and answer practice questions).

The second major dimension of metacognition conceptualized by Flavell (1976, 1979, 1981) is awareness of cognitive processes. The awareness of cognitive processes component of metacognition refers to general strategies used to monitor and regulate ongoing cognitive activities (i.e., Metacognitive Strategies). Flavell (1976) indicated that these metacognitive strategies of monitoring and regulating ongoing cognitive activity are not fundamentally different from cognitive strategies. The main difference lies in the function they serve in attaining a cognitive goal. To quote Flavell (1979): "cognitive strategies are invoked to make cognitive progress, metacognitive strategies to monitor it" (p. 909).

For example, to achieve the cognitive goal of reading a chapter to retain the information for a future test, the cognitive strategies involved in reading are invoked (i.e., word decoding, construction of meaning, etc.). In an attempt to monitor what is being retained a self-questioning strategy (i.e., metacognitive strategy) might be utilized following each subsection of the chapter. If monitoring reveals that little of the chapter has been retained, a regulating strategy (i.e., metacognitive strategy) involving re-reading the section might be instituted. The interplay between the cognitive, monitoring and regulating strategies continues until the cognitive goal is attained (i.e., sufficient memory of the material).

Thus, metacognitive strategies are conceptualized as general, widely applicable plans or routines for monitoring and evaluating the implementation of cognitive strategies and instituting remedial action if blocks to the cognitive goal are encountered. It is postulated that for any given cognitive strategy a number of metacognitive strategies are available.

The author posits that in the sophisticated cognizer, cognitive and metacognitive strategies are selected and invoked based on a match between specific elements contained in Metacognitive Knowledge about Cognitive Processes (i.e., knowledge of person, task and strategy variables), task demands, and perceived criterial performance. Let us use for an example a task in which the cognitive goal is to learn a list of unrelated items (i.e., task demands) for perfect recall (i.e., criterial performance). A rehearsal strategy (i.e., basic cognitive strategy) might be selected and invoked because the individual's Metacognitive Knowledge about Cognitive Processes indicates that from past experience this individual has found the rehearsal strategy to be effective in aiding recall of items (i.e., person x strategy x task knowledge). The individual might also invoke a metacognitive strategy of self-testing after each run through the list to monitor the level of recall, terminating the cognitive strategy when the performance goal of perfect recall is attained.

It is this coordination and orchestration of metacognitive knowledge and the cognitive and metacognitive strategies that is seen as the domain of the Higher Order Coordinating Strategies, which is the most sophisticated level of metacognition. These Higher Order Coordinating Strategies are flexible, widely applicable strategies that oversee the entire cognitive endeavor, and their functions include: (1) assessing the nature of the task demands and criterial performance; (2) formulating a general 'plan of attack' to achieve the cognitive goal based on the information contained in Metacognitive Knowledge about Cognitive Processes, particularly Specific Strategy Knowledge; (3) monitoring and assessing the efficiency and effectiveness of ongoing attempts to meet the cognitive goal and feeding this information back into the system so that appropriate strategy changes can be instituted; (4) determining when the cognitive goal has been met; and (5) based on the results of the specific cognitive endeavor feeding this information back into Metacognitive Knowledge about Cognitive Processes as new bits of information (i.e., regarding person, task and strategy variables). Thus, the deployment of these general Higher Order Coordinating Strategies during any particular cognitive task are assumed to orient the cognizer to the task, and to integrate and coordinate the application of specific task appropriate cognitive and metacognitive strategies on that task.

Figure 1 represents a schematic representation of the various components of Metacognition, as well as the interrelationships between these components when an individual is actively engaged in pursuing a cognitive goal.

These distinctions between the various levels of metacognition including: cognitive strategies, metacognitive knowledge, metacognitive

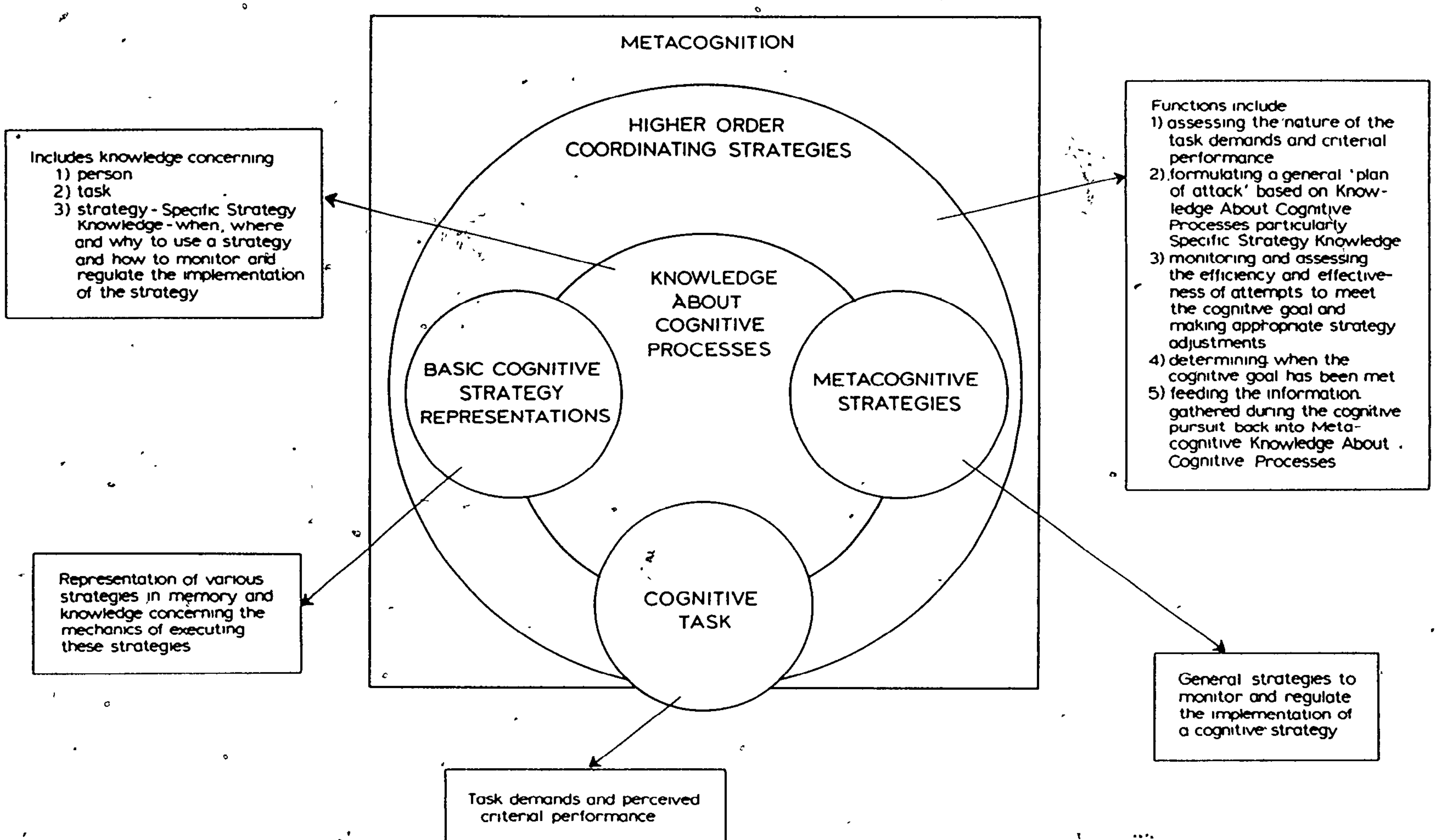


Figure 1 A Schematic Representation of the Components of Metacognition and Their Interrelationships When a Sophisticated Cognizer is Engaged in a Cognitive Task.

strategies and higher-order coordinating strategies, have been presented because of their direct relevance to the instructional procedures developed as part of the present research. It is proposed that by understanding the components and interrelationships between various aspects of metacognition, it is possible to model training procedures on this conceptualization of the metacognitive representations of the sophisticated cognizer, as one means of improving the cognitive performance in less sophisticated cognizers (i.e., young children). This is the approach adopted in the present work.

Based on the present conceptualization of metacognition the author proposes that an effective program to enhance performance on a cognitive task must include: (1) instruction in the basic cognitive strategy involved in efficient performance on the task; (2) instruction in the utilization of appropriate monitoring and regulating strategies (metacognitive strategies) to ensure the optimal deployment of the cognitive strategy; and (3) incalculation of higher order coordinating strategies that oversee both the implementation and modification of the cognitive and metacognitive strategies to meet task demands.

Now that the presumed critical components involved in sophisticated cognitive performance have been delineated, it remains to determine the specific nature of each of these components in efficient listening comprehension monitoring performance. With this goal in mind, a review of the comprehension monitoring literature is presented in the following section.

Review of Comprehension Monitoring Research

In terms of the model of metacognition discussed previously, comprehension and the monitoring of the comprehension process involve the invocation and interplay of a number of metacognitive processes in which an individual's cognitive equipment is focused on the cognitive goal of comprehending or understanding. In the mature cognizer, a symbiotic relationship exists between the processes of comprehension and comprehension monitoring such that each process informs and regulates the other, and the level of understanding that is ultimately achieved is determined by the quality of this interaction. Comprehension monitoring is a product of the more fluid aspect of metacognition that includes strategies for monitoring and regulating cognitive acitivies (i.e., metacognitive strategies). Comprehension monitoring during a cognitive endeavor (e.g., reading, listening) involves keeping track of the success with which comprehension is proceeding (i.e., monitoring), and instituting remedial action if obstacles to comprehension are encountered (i.e., regulating) (Baker, 1979).

While the focus of the proposed research is on listening comprehension monitoring abilities in young children, the literature in this specific area is quite limited. However, there has been a recent explosion of interest in the metacognition-comprehension relationship in other domains of cognitive-developmental inquiry including listener skills in referential communication (e.g., Patterson & Kister, 1981), and reading comprehension (Baker & Brown, in press; Forrest-Pressley, & Gilles, in press). Therefore, in this section I review and synthesize the research from these divergent perspectives, in an effort to present a 'state of the art' analysis of comprehension monitoring abilities in children.

Attempts to study comprehension monitoring across the listening comprehension, referential communication and reading comprehension areas have typically presented subjects with oral or printed material (i.e., narrative or expository text, instructions, messages, etc.), which contain elements designed to deliberately block comprehension (e.g., confusions, embedded errors, ambiguous references, inconsistencies, contradictions, etc.). Besides the obvious differences in the nature of the materials and type of comprehension-impediment employed, the paradigms used to assess the impact of the incomprehensibility has varied across research areas. Methodologies for assessing monitoring or detection of violations of meaningful representations range from verbal techniques (e.g., structured interviews, comprehensibility ratings, etc.) to non-verbal measures (e.g., observations of behaviors that signal confusion or puzzlement). Other investigators have examined the activation of regulating strategies (i.e., actions undertaken to remediate non-comprehension), as indicators of comprehension monitoring abilities (e.g., clarification request for an unclear message, spontaneous correction of oral reading errors). Thus, while the message/text manipulation paradigm is generally consistent across areas, methodologies for assessing comprehension monitoring and regulating are widely discrepant and each has its own limitations and drawbacks (see Winograd & Johnson, 1982, for a discussion).

Other methodological differences across the comprehension monitoring research literature include: age of the subjects (2½ years to adult); level of comprehension monitoring assessed (e.g., whether the comprehension impediment is placed at the level of word, sentence, or paragraph); and assessment of individual difference variables (e.g., good and poor readers). This warning of the difficulties in comparing across these three research areas, is intended to instill caution in the reader prior to commencing a review of the comprehension monitoring literature.

Listening Comprehension Monitoring

There are few studies which examine the abilities of young children to monitor their comprehension of orally presented expository material, with Ellen Markman of Stanford conducting the most relevant studies. I discuss Markman's methodology (Markman, 1977, 1979) because her work motivated the present research, and a similar methodology was adopted in this thesis work.

Markman (1977) presented first, second and third grade children with instructions on how to play a card game and perform a magic trick. Crucial information was omitted from the instructions, rendering them incomprehensible. For example, during the game the children were shown cards to which plastic alphabet letters had been glued. The experimenter dealt herself and the subject four cards each. Then the experimenter provided the following instructions:

> We each put our cards in a pile. We both turn over the top card in our pile. We both look at the cards to see who has the special card. Then we turn over the next card to see who has the special card this time. In the

end the person with the most cards wins.

(p. 998).

Obviously, information is omitted about which is the "special card". Following the presentation, the experimenter asked the following series of increasingly explict probes:

1. "That's it. Those are my instructions."
2. "What do you think?"
3. "Do you have any questions?"
4. "Did I tell you everything you need to know to play the game?"
5. "Did I forget to tell you anything?"
6. "Can you tell me how to play?"

   (The experimenter prompts if necessary)
7. "Did I tell you everything you need to know to play the game?"
8. "Do you think you can play? Let's play; you go first."
9. "Did I forget to tell you anything?"
10. "Are you sure? Did I tell you everything you need to know?" (p. 998)

Each child was assigned a score based on the explicitness of the probe (i.e., 1 to 10) required to elicit a comment that the instructions were deficient.

Third graders reported that the information was incomplete sooner than younger children (e.g., mean probe scores for the card game task were 8.92, 6.17 and 3.08 for the first, second and third graders respectively), providing evidence for developmental differences in spontaneous conprehension monitoring abilities. First graders had to repeat an instruction (probe 6) or attempt to exercise it (probe 8) before they realized the problem. A second experiment established that when the presentation included a demonstration component (i.e., reduced processing requirements) all the children found the omissions easier to detect. The results of both studies suggested that young children process information on a more superficial level (i.e., do not monitor comprehensibility) than do older children.

To define better the limits of children's spontaneous listening comprehension monitoring abilities, Markman (1979) conducted three experiments using orally presented expository passages. Markman (1979) proposed that monitoring understanding of oral expository information would be more difficult than monitoring oral instructions because: (1) the standard for assessing comprehension would be much less clear (i.e., with oral instructions the criteria is whether the stated series of transformations from the initial state match the desired end state); and (2) greater processing demands depending on the level of inferential reasoning required. In all three studies children in third, fifth and/or sixth grades listened to short stories that contained inconsistencies that were either explicitly or implicitly stated. Table 1 contains an example of the type of passage employed by Markman (1979). Both the explicit and implicit inconsistent versions of the passage presented identical initial information: the between-passage differences were in the explicitness of the inconsistencies in the last section of the passage.

Table 1

Example of Explicitly and Implicitly Inconsistent Passages Used in the Markman (1979) Study

Initial Information	Many different kinds of fish live in the ocean. Some fish have heads that make them look like alligators, and some fish have heads that make them look like cats. Fish live in different parts of the ocean. Some fish live near the surface of the water, but some fish live way down at the bottom of the ocean.
Explicit Inconsistency Ending	Fish must have light in order to see. There is absolutely no light at the bottom of the ocean. It is pitch black down there. When it is that dark fish cannot see anything. They cannot even see colors. Some fish that live at the bottom of the ocean can see the color of their food; that is how they know what to eat.
Implicit Inconsistency Ending	There is absolutely no light at the bottom of the ocean. Some fish that live at the bottom of the ocean know their food by its color. They will only eat red fungus.

Markman (1979, Experiment 1) assigned children randomly to one of the two experimental groups. In both groups children were presented three passages: the conditions differed in whether the inconsistencies in the passages were stated explicitly or implicitly. Following presentation of each passage the children answered probe questions ranging from general probes (i.e., "What do you think?") to memory probes (i.e., "Can you tell me everything you learned about fish?") to specific probes (i.e., "How can they see the color of the food in the dark?"). As in Markman (1977), the dependent variable was a score based on the explicitness of the probe required for the child to verbalize the inconsistency.

Ninety-six percent of all children failed to detect the implicit inconsistencies, while performance was better with the explicit passages with 40-50% of the inconsistencies detected. There were no significant grade differences, even sixth grade students did not consistently indicate a problem with explicitly inconsistent materials. Markman (1979) attempted to rule out alternative explanations for her findings including memory failure, limited logical capacity, contradiction-resolving assumptions, and the influence of demand characteristics that inhibited the subjects' responses. This post hoc analysis, however, is subject to the problems and criticisms inherent in this approach.

Markman (1979, Experiment 2) examined the nature of the mental processing required to detect inconsistencies. She reasoned that for "two propositions to be seen as incompatible, at the very least they must be maintained in working memory and compared" (p. 649). Therefore, children could have failed to detect the explicit inconsistencies because they failed to connect the critical sentences (note this would be an insufficient explanation for the failure to detect the implicit contradictions which required additional inferential processing).

Third and sixth graders were assigned to one of the following experimental conditions: 1) sentence repetition in which the subjects had to repeat every two sentences (the essays had been parsed in such a way that the incompatible sentences were presented contiguously); and 2) essay repetition in which the subjects had to repeat the entire essay after it was read to them. Markman (1979) predicted a repetition condition x inference level interaction, such that repeating the incompatible sentences should enhance the ability of the children to detect the inconsistencies in the explicit passages.

Markman's (1979) hypothesis was not supported. Most third graders did not notice the problematic material regardless of condition. While the sentences were activated contiguously in memory, the third graders apparently failed to compare them (Markman, 1979). Sixth graders performed just as poorly as third graders on the implicit passages. Although sixth graders detected more of the explicit inconsistencies than the third graders, there was no effect for repetition condition (i.e., sentence versus essay) with almost all the sixth graders spotting the problem without repetition. Markman (1979) interprets this finding as follows:

> "Their [the sixth graders] unexpected success may have been because in these essays the contradictory sentences were immediately adjacent in the text. Perhaps this contiguity of the problematic material

served a function comparable to repetition--it helped juxtapose the two sentences in memory. Once the sentences are related in memory, sixth graders, unlike third graders, may spontaneously initiate the appropriate comparisons." (p. 651)

Markman (1979, Experiment 3) examined children's abilities to detect explicit and implicit inconsistencies when they were provided with a vague standard for evaluating the passages (i.e., they were told to expect something "tricky", something which does not make sense, in the essays). This instructional manipulation enhanced significantly the performances of sixth grade children. When sixth graders are informed of the existence of a problem, error detection rates between explicit and implicit material disappeared. When sixth graders know there is a problem, they can carry out the inferential processing necessary to find it. Third graders, however, questioned the truth of the essays rather than checking the essays for internal consistency. Thus, these children missed the inconsistencies because they were searching for falsehoods.

While Markman (Capelli & Markman, 1981; Markman, 1979, 1981) has theorized that depth of processing, and an appropriate standard for evaluating comprehension are central to efficient comprehension monitoring, the findings of her 1979 studies did not provide evidence that the performances of young children (i.e., 8 years old) can be enhanced by manipulating these dimensions. However, this emphasis on providing a standard or criterion of evaluation and/or reducing the processing demands to enhance the comprehension monitoring performances of young children is a recurring theme in the monitoring literature.

Shortly, evidence will be presented which supports the hypothesis that manipulating these dimensions can enhance the comprehension monitoring performances of young children on certain tasks. Although I will address issues concerning the standard or criteria of evaluation dimension in more detail later in this thesis, I preview those comments here. Simply providing young children with an evaluation criterion is tantamount to telling them what the end goal of the cognitive activity must be (i.e., find the parts that don't make sense), in the absence of instructing them in the cognitive processes required to arrive at that goal. I do not intend to dismiss the importance of an appropriate standard of evaluation in competent comprehension monitoring (clearly it enhanced the performance of the sixth graders in this study), but to emphasize that effective training must involve instruction in the basic cognitive processes underlying the standard or criterion.

In reviewing all of the available data, Markman (1979) speculated that the following processes might be involved in monitoring an orally presented passage for consistency:

> As each sentence is read, the children must listen to, encode, and store the meanings or propositions that the sentence expresses. In order for two sentences to be seen as inconsistent, the sentence representations must be activated together in working memory. This in itself can be difficult, especially if time and information has passed between the two sentences. Establishing contiguity of the sentences in working memory is not sufficient; sentences must

also be compared to notice their incompatibility. To notice an implicit contradiction one must draw the relevant inferences as well. (p. 653)

Markman (1979) goes on to suggest that, given the complexity of this cognitive process, children should be trained in the subprocesses of comprehension monitoring (i.e., comparison process, appropriate evaluation criterion) to improve their performances in detecting inconsistencies. While Markman's (1979) speculations regarding the processes involved in comprehension monitoring are intuitively appealing, her data only supports the existence of deficiencies in young children's performance and not the nature of the underlying cognitive processes.

Markman's (1977, 1979) error detection pardigm, and particularly the use of probes as the sole dependent measure have been criticized by numerous writers (e.g., Winograd & Johnston, 1982). These criticisms range from: 1) failure to rule out alternative explanations for the children's poor performances besides comprehension monitoring deficits including: lack of prior knowledge, lack of logical capacity to detect the inconsistencies, unwillingness to criticize the experimenter, alternative interpretations of the passages; to 2) problems with the accuracy of children's verbal reports; and 3) the statistical inappropriateness of treating probes as an equal interval measure (Stein & Trabasso, 1982; Winograd & Johnston, 1982). In spite of these criticisms, the finding that young children perform poorly on tasks that require comprehension monitoring remains robust. Subsequent research by Markman and her colleagues (e.g., Markman & Gorin, 1981), as well as other investigators in this area, has further supported the importance of the processing requirements and evaluation criteria in listening comprehension monitoring.

Prior to reviewing the subsequent literature in this area, it should be noted that the level of cognitive processing and the criterion of evaluation required to detect comprehension problems have generally been confounded in the comprehension monitoring literature (i.e., a 'deeper' level of cognitive processing and a more 'sophisticated' criterion of evaluation are required to monitor errors across paragraphs rather than within sentences). This notwithstanding, researchers typically discuss their findings with respect to only one of these dimensions. With this caveat in mind, I will now return to a review of the listening comprehension monitoring literature.

Pace (1980, in Miller, 1982) conducted a study in which kindergarten and second grade children listened to a story about an unfamiliar subject matter (i.e., making lye soap), and were asked comprehension questions that required differential levels of processing (i.e., information contained within a sentence versus knowledge that required integration of information across sentences). The children were told that a relistening strategy (i.e., regulating strategy) could be used to improve their comprehension performance. Pace (1980, in Miller, 1982) observed the children's tendency to use the relistening strategy as well as their ability to correct comprehension errors following relistening. Pace (1980, in Miller, 1982) found that when the children were told when and how to use the regulating strategy, they were able to use it to improve their comprehension performance (kindergarten children corrected 38% of their errors while second graders corrected 48% of their errors). However, the children's competence in correcting their performance was affected by the nature of the comprehension question. The improvement in comprehension performance was generally confined to the within sentence comprehension questions. Both the kindergarteners and the second graders were least successful at correcting errors that required integration across sentences. These results provide further evidence of the differential impact that the nature of the processing demands has on the ability of young children to monitor their comprehension performance.

Baker (1982, in Miller, 1982) distinguished the following three levels of comprehension monitoring based on whether evaluation was conducted at the level of: 1) individual word meanings; 2) external consistency (i.e., comparing text information with prior knowledge); and 3) internal consistency (comparing parts of the text to detect any inherent contradictions). Baker (1982, in Miller, 1982) examined the ability of first, third and fifth grade children to detect errors at these three levels in passages they either listened to or read. All children initially received explicit instructions to find errors, and were given examples of the types of errors to look for (i.e., they were provided with a standard of evaluation). In support of Markman's (1977, 1979) original findings, the older children demonstrated better comprehension monitoring abilities than the younger children. The finding that, when they were instructed to do so, first grade children demonstrated successful monitoring of simple narratives at a more superficial level (i.e., nonsense words, prior knowledge conflicts, and some explicit between sentence contradictions), provides evidence for Markman's (1979) hypothesis regarding the roles of processing demands and the standard of evaluation in efficient comprehension monitoring. However, for all the chiidren monitoring for inconsistency was the most difficult.

Markman and Gorin (1981) examined eight and ten year old children's adjustment of standards for evaluating comprehension when given specific instructions and examples concerning the types of problems to expect (i.e., informed regarding the appropriate standard of evaluation). The children were assigned to one of three experimental groups, and provided with one of the following expectations regarding the evaluation criterion they would need to employ while listening to the expository passages: 1) told to look for falsehoods (i.e., sentences that violated their prior knowledge), and provided with examples of falsehoods (e.g., "Everyone hates ice cream" (p. 321)); 2) told to look for inconsistencies (i.e., sentences that were contradictory), and provided with examples of inconsistencies (e.g., "John loves to ski. John hates to ski." (p. 322)); or 3) given neutral instructions to look for problems, but not provided with examples.

Markman and Gorin (1981) reported a significant interaction of instruction with problem type, such that instructions were instrumental in assisting the children to shift their evaluation standards. Moreover, the children who were alerted to find specific types of problems (i.e., given a standard of evaluation), were generally better at detecting those errors (i.e., falsehoods or inconsistencies) than the children given the neutral instructions. While no developmental differences in performance were noted in the neutral condition, within both standard of evaluation instruction conditions, the 10 year olds performed significantly better than the eight year olds. While these results are encouraging, it should be noted that even the older children set to find specific problems were not performing at ceiling levels (i.e., means of 2.42 and 2.71 out of 4 for the 10 year olds set to find falsehoods and inconsistencies, respectively).

Markman and Gorin's (1981) findings would seem to lend support to Markman's (1979) original supposition that providing children with standards for evaluating comprehension may be an important component of comprehension monitoring training. Alternatively, the lack of optimal performance by the 10 year olds, but especially the 8 year olds, can be interpreted as evidence that young children require explicit training in the cognitive processing required to apply the evaluation criterion.

A recurring theme in the comprehension monitoring literature is that under specific conditions young children can demonstrate the ability to accurately assess their level of understanding. Recently, Tunmer, Nesdale and Pratt (1983) documented the existence of listening comprehension monitoring capabilities in children as young as five years old. To control for factors they hypothesized limited the performances of the children in Markman's 1979 study, Tunmer et al., (1983) modified Markman's (1979) experimental task by using stories that were based on common childhood experiences (e.g., riding a bike, buying candy) rather than expository passages based on unfamiliar animal facts and habits. This manipulation presumably results in reduced processing demands as the child simply has to match the information presented to his own experience in order to detect an inconsistency, versus integrating information across sentences when unfamiliar information is presented in an expository passage.

The information processing demands (i.e., strain on short term memory) were further reduced by presenting the inconsistent propositions contiguously rather than embedding them in the text. Five, six and seven year old children heard consistent and inconsistent versions of either explicit or implicit stories. For example, the following is an explicitly inconsistent story that was used: "At night you cannot see the sun. In the middle of the night Jenny got out of bed and looked out the window. The sun was shining brightly in the sky." An implicitly inconsistent version of this story was created by substituting the sentence "Jenny was sleepy; so she went to bed", for the first sentence of the explicitly inconsistent version. Explicitly and implicitly consistent versions of the story were generated by changing the last sentence of the respective inconsistent versions to: "She could see stars twinkling in the sky.".

The seven year olds correctly judged 90% of the implicit and 97% of the explicit stories as either making sense or being "silly". Even the five year olds correctly judged over 65% of the implicit stories and over 80% of the explicit stories. Tunmer et al. (1983) explain the relatively poorer performances of the children on the implicit stories as reflecting the increased processing demands (i.e., these passages require the children to integrate the information in the stories with material in long term memory such as the 'sun does not shine at night'). Thus, providing further support for the relationship between processing demands and comprehension monitoring capabilities.

Tunmer et al. (1983) were intrigued by the fact that the five year olds judged 42.2% of the implicitly consistent stories as silly. In reviewing their explanations it appeared that the children were judging the stories in terms of the empirical validity of individual sentences (e.g., for the implicitly consistent version of the story above one child stated "you shouldn't get out of bed at night"), rather than integrating the information presented across sentences and evaluating the story as a whole.

Tunmer et al. (1983) hypothesized that while young children could integrate across sentences when the processing demands were low (i.e., explicit stories based on common experiences), with the greater demands of the implicit stories they reverted to the easier strategy of evaluating individual sentences. If this was true, then the performances of the children would be poor on implicit consistent passages and artifically high on implicit inconsistent passages. This hypothesis, of inflated performances on the implicit inconsistent passages, was confirmed when the children's responses were scored using a stricter criterion of correct evaluation of the story <u>and</u> appropriate justification based on integrating information across sentences.

Thus, even young children exhibit comprehension monitoring capabilities when explicit narratives based on common childhood experiences are presented. However, as the processing demands increased (i.e., implicit versus explicit narratives) the performances of all the children deteriorated. This was especially noticeable with the five year olds who tended to revert to more superficial processing (i.e., evaluating individual sentences) when the processing demands were high.

Ackerman, in a series of studies, has also documented proficient performances in children as young as six in detecting a variety of inconsistencies in orally presented narratives including: a speaker's intentional use of a false utterance (Ackerman, 1981); discrepancies between expectations generated by the passage and subsequent actions by characters (Ackerman, 1982a); and interpreting a speaker's sarcastic utterances (Ackerman, 1982b). In each instance, Ackerman employed passages based on events and experiences that are familiar to young children (e.g., running a race, going on a picnic, working in school, etc.).

A recent study by Kooney and Martin (1983) provides additional evidence of the abilities of young children to detect inconsistencies when processing demands are greatly reduced. Again, stories based on the relevant life-experiences of young children were employed. Kooney and Martin (1983) compared the performances of third and sixth grade children in detecting implicit inconsistencies in passages taken from Markman's 1979 study, versus passages based on familiar events. Kooney and Martin (1983) reported that both the third and sixth graders had little difficulty in detecting the implicit inconsistencies in the passages based on familiar events, but were very poor at detecting the implicit inconsistencies in the Markman (1979) passages.

In summary, the limited research on listening comprehension monitoring indicates that even as late as sixth grade children do not evidence spontaneous listening comprehension monitoring capabilities under conditions in which unfamiliar information is presented (e.g., Markman, 1979). However, the performances of sixth graders (but not third graders) can be enhanced by reducing the processing demands by presenting the inconsistent sentences contiguously (e.g., Markman, 1979), or by providing an appropriate standard of evaluation (e.g., Markman & Gorin, 1981).

In contrast to these findings, even five and six year olds demonstrate listening comprehension monitoring capabilities when passages are based on their day to day experiences (e.g., Ackerman, 1982; Tunmer et al., 1983). This latter finding speaks to the rudimentary comprehension monitoring capabilities of young children under conditions of greatly reduced processing demands, and is consistent with findings in the referential communication and reading comprehension literature to be reviewed subsequently.

The focus of the present study, however, is on enhancing the listening comprehension monitoring capabilities of young children in a school-like learning situation. Thus, unfamiliar expository material is used and the child is required to integrate the information that is presented to determine his/her level of understanding. Researchers have consistently reported that young children are very poor at monitoring their comprehension under these conditions (e.g., Baker, 1982 in Miller, 1982). In the light of the focus of the present research, the major issue that is not addressed in the listening comprehension monitoring literature is the nature of the cognitive processes involved in competent comprehension monitoring. Also, questions remain concerning additional factors (besides age, processing demands, and appropriate standard of evaluation) that affect comprehension monitoring abilities in children. Partial answers are suggested in the referential communication and reading comprehension literatures.

Referential Communication

Referential communication refers to a specific language function in which the speaker's intent is to communicate information to a listener(s) about a specific referent. Referents can be of many classes including objects (e.g., the gray cat), locations (e.g., West Avenue), or ideas (e.g., the concept of intelligence) (Asher, 1979).

The basic experimental referential communication paradigm was originated by Piaget (1926) to overcome obstacles encountered in naturalistic study of the referential function of language (Asher, 1979). In referential communication studies speakers and listeners typically are presented an array of referents. The experimenter specifies to the speaker which referent must be identified to the listener. The listener is required to select the correct referent based on the information provided by the speaker. Examples of tasks used in referential communication research include: 1) word pair task (Rosenberg & Cohen, 1966) in which the speaker and listener are presented with pairs of words (e.g., ocean-river), and one of the speaker's words in underlined; 2) novel forms tasks (Glucksberg, Krauss & Weisberg, 1966) in which the speaker and listener are presented with a set of six highly unusual shapes and one is identified as the referent for the speaker; and 3) checkerboard task (Cowan, 1967 in Asher, 1979) in which the speaker and listener have a checkerboard and a set of figures, and the object is for them to place the same ~~objects~~ on the same squares.

Investigators have studied three dimensions of referential communication: 1) the accuracy of the speaker's message (e.g., Glucksberg, Krauss & Higgins, 1975); 2) the listener's response to informative, uninformative, and ambiguous messages by the speaker, and feedback given by the listener when the messages are not clear (e.g., Asher, 1976); and 3) the speaker's use of feedback provided by the listener to modify subsequent messages (e.g., Glucksberg & Krauss, 1967). It is the second line of research, that is relevant to the present review.

Cosgrove and Patterson (1977) conducted the first study in the referential communication literature which focused on listener skills. Nursery school, kindergarten, second and fourth grade children were presented informative, partially informative and uninformative messages regarding the referent picture to be selected. On the pretest the fourth graders spontaneously requested more information in response to partially informative and uninformative messages. Consequently, they made more correct choices. In the experiment proper, Cosgrove and Patterson (1977) provided subjects assigned to the experimental group with the following plan: "Whenever you are not sure what the right answer is, you can ask questions to help yourself figure it out" (p. 559). Cosgrove and Patterson (1977) reported that this simple instructional manipulation, which supplied the children with a standard of evaluation and a simple regulating strategy, significantly improved the performance of all but the youngest children. However, the effects were most pronounced for the kindergarteners and second graders. These results were taken as evidence for a 'production deficiency' explanation (i.e, difficulties represent performance rather than ability factors) of the poor initial performance of the kindergarten and second grade children.

In a subsequent study Patterson, Massad and Cosgrove (1978) examined the "active ingredients" of the plan. The plan was composed of two components: 1) an implicit comparison strategy; listeners were told to "look carefully at the referents and formulate discriminating questions" (p. 402); and 2) an explicit action component (i.e., regulating strategy); children were told to ask questions when they were unsure of the specific referent. Second and fourth grade children were assigned to one of two experimental conditions. In the Comparison Plan condition the children were taught to compare the speaker's message with the array of referents. In the Action Plan condition the children were taught to request additional information if they were unsure which was the correct referent. The children were then presented informative, partially informative and uninformative messages in a referential communication task. The main finding was that, for both age levels, the instruction in the action plan significantly increased the number of questions asked and the selection of the correct referent, and this finding was maintained over a two week period. The fact that a plan to engage in comparison activities had no significant effect on listener performance was interpreted as indicating that the children were engaging spontaneously in this process.

Cosgrove and Patterson (1978) examined the effects of the action plan and the modelling of appropriate question asking behavior by an adult, both alone and in combination, on first grade children's responses to ambiguous messages. Either training alone or in combination resulted in improved performance on immediate and delayed posttesting. Young children seem to possess basic comprehension monitoring abilities in the referential communication situation, and minimal prompting is required to induce children to use these skills.

Recently, investigators in the referential communication area have focused on assessing young children's comprehension monitoring competencies within the referential communication paradigm. In a study by Flavell, Speers, Green and August (1981) kindergarten and second grade children were presented with a series of taped building block instructions, and were told to replicate the buildings. While some instructions that the children heard were clear and easy to follow, the majority contained comprehension and therefore execution problems (e.g., ambiguous references, contradictions, inadequate instructions, memory overload, etc.). Both verbal (e.g., post-task questions) and non-verbal (e.g., indications of puzzlement or confusion while attempting to follow the instructions) measures were collected to distinguish between: 1) the children's detection of problem messages (i.e., comprehension monitoring); and 2) the children's understanding that message inadequacy affects performance (i.e., metacomprehension knowledge). Flavell (1976) proposed that messages and their cognitive representations are largely inaccessible to young children as objects of metacognition, arguing that deficiencies should be noted in monitoring (i.e., detection), regulation (i.e., question asking to clear up comprehension problems), and metacognitive knowledge concerning the role of the message in communication failure.

The most intriguing finding reported by Flavell et al. (1981) was a discrepancy between the kindergarten children's behavior during the message reception/block building and the post-task questioning phases of the study. Sixty-three percent of the kindergarteners were scored as displaying some form of problem detection during the message reception/block building phase when inadquate messages were presented. The bulk of this evidence for kindergarteners detection of message inadequacies consisted of non-verbal indicators (e.g., looks of confusion and puzzlement, pauses, glances, etc.). However, only 20% of the kindergarteners indicated verbally that they detected a problem during the post-task inquiry, and only 8% of these children correctly attributed the blame to the inadequate message. Second grade children detected more errors than the kindergarten children, and indicated greater awareness of the relationship between message inadequacies and comprehension problems.

In a second study Flavell et al., (1981) ruled out an inadequate memory for the message explanation for the pattern of performance exhibited by the kindergarteners in the first study, by having them repeat the message prior to the post-task inquiry. Thus, while kindergarten children possess rudimentary monitoring abilities, they are unable to interpret their feelings of confusion and puzzlement (i.e., metacognitive experiences), and the implications these metacognitive experiences have for their comprehension of the message and subsequent performance.

Extensions of the original work of Flavell et al., (1981) by Singer and Flavell (1981) and Beal and Flavell (1982), provided further evidence that kindergarten children's poor performance in evaluating ambiguous messages is due to a fundamental metacognitive deficit in their knowledge about message adequacy and the communication process.

Other investigators have been intrigued by the rudimentary monitoring abilities uncovered by Flavell et al. (1981), and have studied these abilities in young children. In Revelle, Karabenick and Wellman (1981) 2 to 4 year-olds attempted to resolve a variety of communication difficulties (i.e., referential ambiguity, memory overload and unintelligible message) in a naturalistic setting (i.e., playroom) with familiar and simple stimuli. On some comprehension problems (i.e., unintelligible message) even 2 1/2 to 3 1/2 year olds discriminated between requests that posed problems and those that did not, and took appropriate remedial measures to resolve their noncomprehension. Differences in performances between the 3- and 4-year-olds emerged on the ambiguous passages and those causing memory overload. Three-year-olds actually over-monitored, asking unnecessary questions. Four-year-olds, however, demonstrated appropriate, and efficient monitoring and regulating strategies for all the comprehension problems they encountered.

Processing demands in Revelle et al.'s (1982) were low compared to demands in other studies (e.g., Cosgrove & Patterson, 1977). When processing demands are reduced, young children demonstrate efficient comprehension monitoring capabilities not otherwise evidenced. For example, Patterson, O'Brien, Kister, Carter and Katsonis (1981) systematically varied the stimulus complexity (i.e., number of potential referents) and message adequacy dimensions of referential communication tasks presented to kindergarten, second and fourth grade children. When processing demands were high (i.e., complex referent arrays combined with ambiguous messages), fourth graders but not younger children monitored comprehension effectively. However, with reduced task demands even kindergarten children monitored effectively. These findings were replicated in a second study in which further processing reductions in referential communication tasks resulted in appropriate monitoring by preschool children.

Pratt and Bates (1982) examined perceptual context (i.e., presence or absence of pictures) as a factor that reduces processing load and increases the monitoring performance of preschool children on referential communication tasks. Their hypothesis was supported. Children detected more ambiguous messages when pictures were present. In the second experiment they used a verbal self-regulation technique (Meichenbaum & Goodman, 1971) to instruct preschool children in either: 1) a simple question-asking rule (i.e., the children were instructed to ask questions to narrow the possibilities when they were unsure of the referent); or 2) question-asking rule plus evaluative comparison of message and referents. Pratt and Bates (1982) showed that instruction in a simple-question asking rule was sufficient to induce efficient performance in preschool children. Comparison strategy instructions did not add to the effects of simple question induction, reminiscent of Patterson, Massad and Cosgrove's (1978) finding (i.e., nonsignificant effects of instructing second and fourth grade children in comparison activities). In summary, preschool children can use the appropriate message-referent comparison strategies to monitor comprehension of ambiguous messages, provided that task complexity does not obscure these basic capabilities.

Two individual difference variables have been studied in the referential communication literature. Two studies have appeared which examined reading skill and comprehension monitoring on referential communication tasks, both studies employed children with deficient reading skills, comparing their performances with average readers matched on either age or IQ. Less skilled readers are less able to monitor messages for inadequacies (Donahue, Pearl, & Bryant, 1980), and they are less able to judge when sufficient information has been presented to perform a task (Kotsonis & Patterson, 1980). These studies provide preliminary evidence for hypotheses that children with learning difficulties suffer metacognitive deficiencies (e.g., Torgenson, 1977).

Cognitive style, particularly reflectivity-impulsivity, and performance on referential communication tasks has been the focus of investigations by Brodzinsky, Feuer and Owens (1977) and Pratt and Wickens (1983). The hypothesis which guided these studies was that because reflectives have longer response times and compare referents more thoroughly on scanning tasks (see Messer, 1976 for a review), they should detect more referential ambiguities than impulsives who respond more quickly and are less thorough. Brodzinsky et al. (1977) found that reflective fourth and seventh graders were better than their impulsive peers at detecting a variety of within-sentence ambiguities (i.e., lexical, phonological and syntactical).

Pratt and Wickens (1983) findings on this cognitive style variable are more equivocal. In their first study, they reported that reflective kindergarten and second-grade children detected more ambiguous references in brief messages than their impulsive age-mates. However, this findings was not replicated in a second study with first grade children. In a third study with first, third and sixth graders, more reflective listeners detected referential ambiguities but no other message problems (e.g., missing story themes, missing resolutions, etc).

In summary, age, processing demands, whether a standard for evaluating messages is provided, and individual difference factors (such as reading skill or cognitive style) combine to determine employment of monitoring and regulating strategies (i.e., metacognitive strategies) on referential communication tasks. When tasks are simple, three-year-olds evidence monitoring and cognitive regulation while engaging in referential communication (e.g., Revelle et al., 1982). As task complexity increases young children's spontaneous monitoring and regulation deteriorates (e.g., Patterson et al., 1981). Although young children do not provide verbal evidence of their comprehension monitoring capabilities on complex tasks, their non-verbal behaviors suggest rudimentary monitoring (e.g., Flavell et al., 1982). By age nine children evidence spontaneous monitoring of comprehension problems across referential communication tasks (e.g., Cosgrove & Patterson, 1977). Children's comprehension monitoring on referential communication tasks can be improved by reducing processing demands (e.g., Pratt & Bates, 1982), or providing instructions to ask questions when unsure of the referent (i.e., a standard of evaluation and regulating strategy) (e.g., Cosgrove & Patterson, 1977), each with encouraging results. Finally, from the research on individual differences there is emerging evidence that good readers (e.g., Donahue et al., 1980) and reflective children (e.g., Pratt & Wickens, 1983) demonstrate superior comprehension monitoring performances on referential communication tasks.

Taken together, the findings from the referential communication literature, when compared to the listening comprehension literature, provide some interesting areas of speculation. For example, perhaps providing young children with a standard for message evaluation was successful because of the concrete nature of the stimuli typically employed in referential communication tasks. In contrast, perhaps providing a standard of evaluation failed to facilitate listening comprehension monitoring performances in young children because of the more abstract nature of the experimental stimuli (i.e., passages).

Researchers in the area of referential communication have not illuminated the nature of the cognitive processing involved in comprehension monitoring. Attempts to provide evidence of the role of comparison processing in efficient comprehension monitoring of young listeners have been unsuccessful, and it is proposed that young children engage spontaneously in these processes. Again, perhaps this can be attributed to the concrete nature of the referential communication stimuli (i.e., because one must use the information contained in the message to select an object from an array of referents it may be more obvious that one must compare all the referents before choosing). The fact that there is an emphasis on comparison processing in training speakers to produce adequate messages in referential communication tasks (e.g., Asher & Wigfield, 1981), can be interpreted as partial support for this hypothesis.

Thus, many questions regarding the parameters of comprehension monitoring, and the nature of the cognitive processing involved, remain unanswered. I now turn to a review of the reading comprehension literature to complete the overview of the comprehension monitoring literature.

Reading Comprehension Monitoring

While there are many differences between listening comprehension and reading comprehension (Kleiman & Schallert, 1978), reading is essentially a meaning-getting process, "and any attempt to comprehend must involve comprehension monitoring" (Baker & Brown, in press, p. 4). One trend in the reading research is toward detailing the metacognitive role in reading (e.g., Yussen, Mathews, & Hiebert, 1981), focusing on the influence of knowledge about reading and comprehension monitoring on efficient reading strategy usage (Forrest-Pressley & Gilles, in press). Thus, the reading comprehension literature provides additional information on children's comprehension monitoring.

A number of researchers have examined whether proficient readers (i.e., adults) monitor their comprehension adequately. Baker (1979) had college students read three-paragraph expository passages. The middle paragraph in each passage contained either a contradiction, an ambiguity or an illogical connective. Students were told to read the passages and were not warned of possible problems. Sixty-two percent of the confusions were not reported. Students used "fix up" strategies (e.g., made inferences, assigned alternative interpretations to the passage, decided the problem was trivial and ignored it) to resolve comprehension problems. Students probably did not fail to monitor their comprehension but possessed inadequate criterion for evaluating comprehension, and used "fix up" strategies to resolve comprehension problems.

Subseqùent research by Baker, Anderson, Standiford and Radin (1979, in Baker 1979), and Glenberg, Wilkinson and Epstein (1982) provided additional evidence that the comprehension monitoring performances by college students are far from perfect and can be improved by providing evaluation criterion. Even when college students are instructed specifically as to type of errors there continue to be problems associated with detection of more subtle inconsistencies (e.g., across-paragraph versus within-paragraph inconsistencies). As well Tikhomirov and Klochko (1981) reported that adults often missed inconsistencies in passages, although monitoring was better when adults processed materials to a "deeper" level (i.e., read with the goal of finding contradictions versus reading to check for grammatical errors or remember text). Tikhomirov and Klochko (1981) also noted "fix up" strategies in the adults recall of the passages, which is reminiscent of the findings of Baker et al. (1979, in Baker, 1979) and Glenberg et al. (1982).

An especially intriguing aspect of Tikhomirov and Klochko's (1981) report is their use of galvanic skin responses (GSR) in this type of research. Analysis of the GSR data provided strong evidence that increases in skin resistance precede temporally the verbalization of the inconsistency. When the detection was verbalized, skin resistance fell. Thus, it appears that the contradiction is detected at an unconscious non-verbal level before it is verbalized (cf. Flavell et al., 1981). Both GSR and non-verbal behaviors can be conceptualized as operationalizations of Flavell's (1979) concept of metacognitive experiences that trigger metacognitive knowledge and awareness regarding the cognitive endeavor.

A recent study by Ryan (1984) provides ecological validity for the relationship between one's comprehension criterion and actual academic performance. Ryan (1984) had 90 undergraduates describe the criteria they used to decide whether or not they had comprehended a reading assignment. Based on their written response, students were classified as employing either a knowledge (e.g., concerned with recalling specific facts) or comprehension/application (e.g., concerned with integrating the information) comprehension monitoring standard. Student's epistemological beliefs (i.e., understanding of the nature of knowledge and the learning process) were classified as either fact-oriented (i.e., knowledge as discrete facts) or context-oriented (i.e., knowledge as an array of interpretations) based on their ratings of attitude statements related to academic performance.

Ryan's (1984) findings support the hypothesis that one's comprehension standard is associated with one's epistemological beliefs. Students with fact-oriented beliefs about the nature of knowledge reporting using knowledge-based criterion for assessing their comprehension. On the other hand, students reporting context-oriented epistemological beliefs made reference to more comprehension/application types of standards.

Relevant to the present discussion, Ryan (1984) reported that the nature and number of comprehension criteria reported by the students were predictive of their performance in an introductory psychology course. Students who reported using comprehension/application standards were almost twice as likely to earn A's and B's in the course, compared to students employing knowledge standards. These findings remained robust even after the effects of academic aptitude or the amount of college experience was partialled out. Thus, one's choice of a comprehension criteria is highly associated with academic performance. Also, students who reported multiple comprehension monitoring criteria earned better grades than those reporting a single criterion. According to Ryan (1984): "These data suggest that one's epistemological beliefs may dictate one's choice of comprehension standards, and these epistemological standards, in turn, may control the effectiveness of one's text processing efforts." (p. 248).

In summary, even adults sometimes fail to report problems in text. Adults' comprehension monitoring is affected by the nature of the evaluation criterion and depth of text processing. Also, it is possible to discern comprehension problems at a physiological and a verbal level, with physiological indications of problems more sensitive than verbal measures.

The preponderance of reading comprehension research that is relevant to the present work has focused on the relationship between ability differences (i.e., good and poor readers), and the use of monitoring and regulating skills during reading. Typically in metacognitive studies good and poor readers are equated for basic cognitive abilities (e.g., decoding, vocabulary knowledge), so that good and poor refer to comprehension skills. As will become obvious, the terms poor readers and learning disabled readers are used interchangeably by researchers in this area. While this writer will use terminology consistent with the study being discussed, further work is needed to either distinguish these as separate groups, or adopt one label for both groups.

Wong (1979) has provided evidence of differential monitoring of written material by average and learning disabled readers. Wong (1979) had average readers and children with deficient reading skills listen to a story and follow along with the written text. For half of the children, questions related to thematically important information were included in the text. Only when questions were included in the story were the children with deficient reading skills able to recall the same amount of thematically relevant information as the average readers. Thus, while average readers are able to regulate their story comprehension, learning disabled readers are inactive unless prompted.

Fifth and sixth grade poor readers are deficient in the use of active monitoring and regulating strategies during reading across various text manipulations including gist violations (Garner, 1980), discrepancies between text and context (Winograd & Johnson, 1982), and uncommon subject-predicate pairings (i.e., 'the hungry boy took a nap', Owings, Peterson, Bransford, Morris & Stein, 1980). Also, poor readers do not remediate comprehension failures as well as good readers. For instance, DiVesta, Hayward and Orlando (1979) employed a cloze procedure to study how good and poor readers (high school and middle school levels) utilized previous or subsequent text to supply missing words. While good readers performed equally well on both types of word omissions, poor readers did less well when they were required to search subsequent text to provide missing words.

During oral reading good first grade readers corrected grammatical errors better than poor readers (Weber, 1970). In Weber's experiments good readers corrected 85% of the grammatically unacceptable errors and

27% of the grammatically acceptable errors, with poor readers correcting 40% and 32% of these errors, respectively. Garner and Reis (1981) provided additional documentation of better regulation by good versus poor readers. Seventh-grade children were presented a narrative story. There were comprehension questions at the bottom of each page that could be answered either from information presented on that page, or required looking back to a previously read page. There were no significant differences between good and poor readers on the non-lookback questions. On the lookback questions 30% of the good readers looked back and correctly answered the question, compared to 9% of the poor readers who did so.

While the research reviewed above has provided evidence of comprehension monitoring differences linked to ability, when processing demands are reduced even poor readers can monitor comprehension efficiently. Fourth through sixth grade poor readers can detect problems at the level of words and sentences with the same degree of proficiency as good readers (Garner, 1981; Paris & Myers, 1981), although poor readers are unable to detect problems that require intregration across sentences (Garner, 1981). Kaufman (1981, in Miller, 1982), in a study correcting some methodological problems contained in Garner's (1981) study, reported results consistent with those of Garner (1981) and Paris and Myers (1981).

Attempts to facilitate improved comprehension monitoring performances by poor/learning disabled readers are rare in the literature. Bos and Filip (1981, in Bos & Filip, 1982) provided further evidence that children with deficient reading skills are inactive in the evaluation of their comprehension processes, and their performance can be enhanced by inducing them to be more active. They presented average and learning disabled readers with passages similar to those used by Markman (1979) (i.e., expository passages that contained interpropositional inconsistencies). The children read the passages once silently and once out loud. Following this, the experimenter asked increasingly specific questions, and the dependent measure was the number of questions asked before the child indicated the passage was inconsistent.

While the average readers noted the inconsistency with only a general probe (i.e., "Did this story make sense?"), the learning disabled readers required signficantly more specific probes (i.e., the inconsistency was pointed out to them).

On a second passage Bos and Filip (1981, in Bos & Filip, 1982) cued the children that the passage did not make sense. Under these instructions, the average and learning disabled readers were equally adept, with 85% of all the children noting the inconsistency. However, three of the learning disabled readers failed to detect the inconsistency even when cued.

Bos and Filip interpret these findings as supporting a 'production deficiency' (i.e., they fail to activate task-appropriate strategies) explanation of the comprehension monitoring deficiencies of learning disabled readers. However, they point out that the deficient comprehension monitoring skills exhibited by some of the learning disabled readers (i.e., the three who failed to monitor even when cued) may represent a specific ability deficit.

Garner and her colleagues also studied the effects of explicit prompts on monitoring in poor readers, with contrasting results to those reported by Bos and Filip (1981, in Bos & Filip, 1982). In Garner and Anderson (1982) middle grade children were assigned randomly to one of three pre-reading instruction treatment groups. They were told to either read the stories, read the stories to determine if they made sense, or instructed to find the part that did not make sense (i.e., an explicit evaluation criterion). Garner and Anderson (1982) predicted that children given the last instruction would demonstrate superior monitoring. All the children, however, performed at a low level. Also, when poor readers in grades 4, 6 and 8 are given increasingly explicit prompts, up to pointing out the inconsistent sentences, there is little improvement in monitoring (Garner & Taylor, 1982). Thus, the provision of an evaluation standard is insufficient to improve monitoring in poor readers. At a minimum more explicit instructional interventions are required.

Despite widespread documentation of monitoring differences between good and poor readers, and instructional failures to improve poor readers' monitoring, Miller (1982) provided the following caution:

> The literature investigating the development of comprehension monitoring abilities has certainly documented performance differences between skilled and less-skilled readers. On the basis of these findings, one might be tempted to conclude that cognitive deficits account for less-skilled readers' deficient performances. Inferences

> about ability deficits must not be made solely on the basis of poor performance. The inadequate monitoring and regulating performances of poor readers may reflect what Flavell (1977) has termed a production deficiency or what Campione and Brown (1979) refer to as inadquate use of executive control processes. Improved performances after task or training manipulations designed to encourage more effctive strategy utilization would lend support to these notions. (p. 44)

Miller (1982) conducted the first extensive training study on comprehension monitoring. She attempted to improve the detection of 'between sentence' errors during reading of average and superior fifth grade readers. Training was based on Markman's (1979) conceptualization of the crucial components involved in comprehension monitoring including depth of processing and evaluation criterion.

The experiment included two groups that received self-instructional training (Meichenbaum & Goodman, 1971). The children were initially exposed to a model emitting the following self-statements: 1) task relevant statements to identify the problem and an appropriate strategy to solve the problem, 2) self-guiding statements to implement the strategy, 3) self-monitoring statements to evaluate progress and correct errors, and 4) self-reinforcement statements to reward correct performance (Meichenbaum, 1975). Subsequently, children practiced and received feedback in these statements while completing the training task(s).

One self-instructional training group (Specific Self-Instruction Group) was provided with an explicit standard of evaluation. That is, children were instructed to focus on oppositional meanings between sentences. The Neutral Self-Instruction Group did not receive the standard of evaluation. Control children received the same instructional training as Neutral Self-Instruction subjects, except that the statements were worded in the second person to control for the active participation (Didactic Control Instruction).

During training children were exposed to two passages, one with and the other without an embedded error. Subsequently the children were presented with eight test passages (4 containing errors, and 4 without errors) immediately following training, and one week later.

Immediately following training average readers in all three experimental conditions displayed equivalent improvement from pretest levels of performance, while the superior readers in the Specific Self-Instruction Group improved more than those assigned to the Didactic Control Group. At one week, however, no improvement differences were noted between groups at either ability level (Miller, 1982).

Although Miller's (1982) results were mixed, her study was a first attempt to train comprehension monitoring. The most important limiting factors of Miller's (1982) study were, including limited training (i.e., only two passages were used), failing to assess the child's proficiency with the trained strategies, a lack of specificity of the strategies to be used in applying the standard of evaluation to detect the errors, and comprehension monitoring was demonstrated in a post hoc fashion, as opposed to an active and planful fashion in that the model indicated detection of the error after reading the entire passage.

Nonetheless, despite these limitations, Miller's (1982) data are consistent with the position that gains can be expected from comprehension monitoring training.

In summary, the bulk of reading comprehension research has focused on examining the differences between good and poor readers in efficient comprehension monitoring (e.g., Garner & Reis, 1981). Even adults are far from perfect on tasks requiring comprehension monitoring (e.g., Baker, 1979), however, providing explicit evaluation criterion can increase competent comprehension monitoring in both children and adults (e.g., Garner & Anderson, 1982; Glenberg et al., 1982; Paris & Myers, 1981). Also, there is evidence of the ecological validity of the role of comprehension monitoring criterion in academic performance (Ryan, 1984). Relevant to the present research, there is initial support that comprehension monitoring skills can be trained (e.g., Miller, 1982).

Having completed a review of the comprehension monitoring literature from the diverse cognitive-developmental perspectives of listening comprehension, referential communication, and reading comprehension, the focus of the next section will be on a synthesis of this information in an attempt to distill the common findings, and provide an overview of extant knowledge regarding comprehension monitoring abilities in young children.

Synthesis of the Comprehension Monitoring Research

The most obvious conclusion gleaned from the review of comprehension monitoring research is that young children (e.g., 2-10 years) often indicate they understand incomprehensible material (i.e., 'delusion of comprehension' phenomena). While comprehension monitoring increases with age, even adults do not detect comprehension problems perfectly (i.e., Baker, 1979, Tikhomirov & Klochko, 1981). Task dimensions (e.g., Patterson, et al., 1981), processing requirements (e.g., Garner, 1981), explicitness of the instructions (e.g., Cosgrove & Patterson, 1977), appropriate standard of evaluation (e.g., Markman & Gorin, 1981) and individual differences (e.g., Garner & Reis, 1982), affect children's monitoring and regulation of comprehension. When tasks are simple, processing requirements are minimal, and instructions explicit (i.e., provision of a standard of evaluation), even preschoolers can monitor comprehension (e.g., Revelle et al., 1981; Tunmer et al., 1983). Under less than optimal conditions young children may monitor at some level even though they do not report it verbally. They look uncertain, puzzled etc. when confronted with a comprehension problem (e.g., Flavell et al., 1981).

The question remains how to enhance the rudimentary comprehension monitoring capabilities of young children. Markman (1979, 1981), proposed two basic skills as part of comprehension monitoring, efficient cognitive processing and having an appropriate standard of evaluation. Attempts to promote efficient comprehension monitoring in young children have generally focused on one of these two dimensions with limited success (e.g., Markman & Gorin, 1981; Patterson et al., 1978). However, Miller (1982) provided preliminary evidence in favour of self-instructional training approach (Meichenbaum & Goodman, 1971), which includes both dimensions of comprehension monitoring skills.

Miller (1982), however, failed to instruct the children in the cognitive processes involved in applying the standard of evaluation for assessing comprehension.

In this thesis I intended to uncover the basic cognitive processes in efficient comprehension monitoring and incorporate this into an instructional package for young children as a means of improving their listening comprehension monitoring performances. Extending Miller's (1982) work, the self-instructional training paradigm was seen as an excellent format to induce active cognitive involvement of children during training, provide an explicit standard of evaluation to be used to assess comprehension, and instruct children in the basic cognitive and metacognitive strategies involved in applying the standard.

Given the emphasis in the proposed research on an instructional methodology, the next section will deal with issues pertinent to instructional research.

<u>Instructional Methodology</u> -- <u>Issues and Innovations</u>

Belmont and Butterfield (1977) outlined the instructional approach to cognitive-developmental research as a distinct research genre fraught with its own particular limitations and obstacles, but holding exciting new promise for the empirical study of the development of cognitive processes. They defined instructional research as follows:

> By instruction we mean calculated models, suggestions, rules, or injunctions that have a known influence on the way a child thinks about the materials with which he must work in the laboratory task. The definition rules

> out instructions and demonstrations that simply define the criterion task's information-processing requirements, and it rules out variables relating to the materials, such as choices, arrangements, modes, and rates or rhythms of presentation. We recognize that task instructions and arrangements of materials do influence a child's thinking, and this is precisely what they are intended to do. But the thinking they influence concerns grasping the task requirements. By contrast, cognitive instruction is directed at solutions to meet those requirements. (p. 446)

A basic working assumption of the instructional approach is that young children do not lack cognitive <u>structures</u>, but do not execute spontaneously the <u>processes</u> used by mature cognizers to perform competently on cognitive tasks (Belmont & Butterfield, 1977). Thus, the investigator's first task is to uncover the cognitive processes involved in efficient performance on the criterion task, and then to teach children to use those processes efficiently (Belmont & Butterfield, 1977). Also, a commitment to an instructional approach to research implies that when instructions fail to enhance the performance of young children the researcher must "improve the instructional routine until it works to whatever standard has been adopted" (Belmont & Butterfield, 1977, p. 465).

Previously, a model of metacognition was presented to provide a theoretical base for the nature of the cognitive processes involved in competent performances on cognitive tasks, and to provide a framework for an instructional package. Three components of metacognition were implicated in sophisticated cognitive performance, basic cognitive strategies, metacognitive strategies of monitoring and regulating which direct deployment of cognitive-strategies, higher order coordinating strategies which oversee the implementation and coordination of the cognitive and metacognitive strategies. From an instructional research viewpoint, performance on cognitive tasks should be enhanced by instructing these components when learners do not possess them already. We know little about whether instruction of these components influences comprehension monitoring, with Miller's (1982) study the sole attempt to instruct children in comprehension monitoring skills according to Belmont and Butterfield's (1977) criteria. However, Miller (1982) failed to complete a thorough task analysis of the processes involved in comprehension monitoring, an important prerequisite to instructional intervention (Belmont & Butterfield, 1977). To remedy this failure, in this thesis a pilot study will be reported that was aimed at illuminating the nature of the cognitive processes underlying the listening comprehension monitoring performances of adults.

An important goal of instruction is to produce durable skills. Durability of training, or maintenance, is indexed by the subject's ability to perform on tasks that are similar to those used during training (i.e., new stimuli). Maintenance of the trained skills addresses the adequacy of training, and speaks to the investigator's ability to analyze the task requirements and instruct the subject in the appropriate cognitive strategies (Belmont & Butterfield, 1977; Brown, 1978).

Self-instructional training (Meichenbaum & Goodman, 1971) is a recent innovation in instructional research which has demonstrated efficacy in promoting maintenance of instruction. Self-instructional training combines traditional techniques of behavior modification (e.g., modeling, overt and covert rehearsal, prompts, fading, feedback and reinforcement) with strategy instruction. Meichenbaum and Asarnow (1979) delineated the following components self-instructional training:

> a) problem identification and definition or self-interrogation skills ("What is it I have to do?");
>
> b) focusing attention, and response guidance, which is usually the answer to self-inquiry ("Now, carefully stop and repeat the instructions.");
>
> c) self-reinforcement involving standard-setting and self-evaluation ("Good, I'm doing fine."); and
>
> d) coping skills and error-correcting options ("That's okay...Even if I make an error I can go slowly."). (p. 13)

Many cognitive skills, such as comparison strategy in match-to-sample tasks (Meichenbaum & Goodman, 1971) and rehearsal strategy on a serial recall task (Asarnow & Meichenbaum, 1979), can be taught within the general self-instructional format. Impressive evidence from both experimental and applied domains of inquiry have supported the efficacy of a self-instructional training approach to the acquisition and maintenance of such diverse cognitive skills as: developing reflective problem solving approach skills on cognitive, academic and social tasks in hyperactive boys (Douglas, Parry, Marton, & Garson, 1976); enhancing reading comprehension skills in 7th and 8th grade students (Bonmarito & Meichenbaum, reported in Meichenbaum & Asarnow, 1979); improving the performance of aggressive second grade boys on tests of cognitive abilities and in social situations (Camp, Blom, Hebert, & VanDoornick, 1977); increasing poor readers' recall of story information (Short & Ryan, 1972, in Miller, 1982); enhancing the writing abilities of college students (Day, 1980, in Miller, 1982); promoting improved serial recall of items on a memory task with kindergarten children (Asarnow & Meichenbaum, 1979); and enhancing the performance of kindergarten children on a match-to-sample task (Meichenbaum & Goodman, 1971).

Thus, I propose that self-instructional training provides the child (or subject) with a general problem solving set, as well as a series of general steps to follow in completing a task, which permits the transportability of these skills across time resulting in the durability of these trained skills (i.e., maintenance).

Many theorists (e.g., Meichenbaum & Asarnow, 1979) have been intrigued by the parallels between self-instructional training and metacognition. Brown (1978) has described metacognitive processes as including the ability to:

(1) predict the system's capacity limitations;

(2) be aware of its repertoire of heuristic routines and their appropriate domain of utility;

(3) identify and characterize the problem at hand;

(4) plan and schedule appropriate problem-solving strategies;

(5) monitor and supervise the effectiveness of those routines called into service; and

(6) dynamically evaluate these operations in the face of success or failure so that termination of strategic activities can be strategically timed (p. 82).

Brown's discussion of the metacognitive processes of predicting, planning, checking, self-questioning, self-testing, and monitoring of ongoing attempts to problem-solve is in many respects parallel to the content of the self-statements used during self-instructional training (Meichenbaum & Asarnow, 1979). In addition, the functions ascribed to metacognition by Brown (1978), are strikingly similar to those discussed previously as a specific component of metacognition labelled Higher Order Coordinating Strategies. Thus, I propose that the self-instructional training approach can be utilized to operationalize the Higher Order Coordinating Strategies that have been implicated in competent cognitive performance, and promote maintenance of trained strategies.

In summary, adopting an instructional approach to the present research necessitates a task analysis of the skills involved in listening comprehension monitoring. Previously, a model of metacognition was presented which specified the categories of strategies (i.e., basic cognitive strategies, metacognitive strategies, higher-order coordinating strategies) that are invoked during competent performances on cognitive tasks, and therefore must be delineated in a task analysis. A self-instructional training approach appears to be an appropriate operationalization of the Higher Order Coordinating Strategies that oversee the implementation, coordination, and modification of the cognitive and metacognitive strategies in meeting task demands, and promoting maintenance of training. However, a review of the comprehension monitoring literature has not illuminated the precise nature of the cognitive and metacognitive strategies involved in listening comprehension monitoring. Therefore, a pilot study was conducted in an attempt to uncover these strategies in adults' performances on listening comprehension monitoring tasks. Following this, pilot work was conducted with children to determine the most efficacious procedures to train children to employ these strategies. I will now turn to a discussion of these pilot studies.

PILOT STUDIES

Adult Pilot Study

The focus of the first pilot study was on discerning the nature of the basic cognitive strategy involved in efficient listening comprehension monitoring. Adults served as subjects in this study because they are more proficient at comprehension monitoring than children. The main measure of interest was the adult subject's reports of their introspections regarding their cognitive processes after listening to passages containing inconsistencies.

Method

Subjects

Sixteen adults (i.e., 18 years of older) participated in the adult pilot study.

Materials

The materials for this pilot study were taken directly from Markman (1979). Four of Markman's (1979) passages were used (i.e., 'Snakes', 'Ants', 'Pigeons', and 'Fish'). Three of the passages (i.e., 'Snakes', 'Ants', and 'Pigeons') were presented in either their explicitly inconsistent or implicitly inconsistent versions, while the fourth passsage (i.e., 'Fish') was altered to produce explicitly and implicitly consistent versions of this passage. The passages used in this pilot study are reproduced in Appendix A. The passages were presented to the subjects via tape recorder. All the stories were recorded by an adult male.

Procedure

Each adult was seen individually and was provided with the following rationale for listening to the tapes:

> "I am planning to conduct some research which requires eight year old children to listen to nature stories. But, before I present the stories to the children I am having adults listen to them first to get some idea of how easy they are to understand. I want you to listen carefully to each story. I am interested in your comments as to how clear each passage is, whether you found it easy to understand, whether it made sense, etc. I am also interested in your suggestions regarding how I might change the passages to make them easier to understand."

Half of the adults heard the passages in the following fixed order: 1) 'Snakes' - explicitly inconsistent; 2) 'Ants' - implicitly inconsistent; 3) 'Pigeons' - explicitly inconsistent; and 4) 'Fish' - implicitly consistent. The remaining subjects heard the passages in the following fixed order: 1) 'Snakes' - implicitly inconsistent; 2) 'Ants' - explicitly inconsistent; 3) 'Pigeons' - implicitly inconsistent; and 4) 'Fish' - explicitly consistent. Thus, half of the subjects heard two explicitly inconsistent and one implicitly inconsistent passages, while the remaining subjects heard two implicitly inconsistent passages and one explicitly inconsistent passage. All the subjects heard a consistent passage (i.e., either explicitly or implicitly consistent) as their final story.

Following the presentation of each passage, the subjects were asked the following series of questions in an interview format: 1) "Did the story make sense?"; 2) "Tell me everything you can remember about that passage"; and 3) the passage was re-played, and the subject was instructed as follows: "This time I want you to listen to the story and recall what you were thinking about the first time you heard this passage." These questions correspond to: 1) a general probe regarding listening comprehension monitoring; 2) a memory for passage details probe; and 3) an instruction to introspect on the cognitive processes involved in listening to the passage. The subjects' responses to these questions were recorded verbatim.

Scoring

The dependent measures were scored as follows:

1) Listening Comprehension Monitoring Probe--On each inconsistent passage the subject was assigned a score of 1 if s/he correctly stated that an inconsistent story did not make sense, and was able to provide a justification for this judgment by specifying the inconsistent sentences. All other responses for the inconsistent passages were scored 0. On the consistent passage the subject was assigned a score of 1 if s/he indicated that the story made sense.
2) Memory for Story Details Probe--Each sentence of each story was viewed as containing one idea unit. Subjects' recall of the stories was scored for the number of idea units recalled. Total idea units for the stories ranged from ten to thirteen.

3) Introspection of Cognitive Processes During Listening --No formal scoring criteria was developed a priori for this measure. A scoring system was developed post hoc based on an examination of the trends in the subjects' responses. The nature of the scoring system that was developed is elaborated below when the results of this measure are discussed.

Results and Discussion

There were a number of points during the interview following the presentation of each passage that a subject could notice the inconsistency. After the presentation of each passage the subject was immediately asked if the story made sense. Following this, subjects were asked to recall passage details and then were asked to relisten to the taped story, and introspect regarding their cognitive processes upon first hearing the story. This would allow the subjects two opportunities for delayed noticing of the inconsistency. Table 2 presents the proportion of adults in each group who detected the inconsistencies on immediate and delayed probing.

The most impressive finding to emerge from this analysis is the poor performance of the adults in monitoring their comprehension of orally presented materials. Less than forty percent of the adults presented with the implicitly inconsistent version of the 'Snakes' passage noted the inconsistency, while only half of the subjects presented with the explicit version of this passage noted the inconsistency. For both experimental groups there is a trend toward improved performance across presentations of the three inconsistent

Table 2

Proportion of Subjects Detecting Passage Inconsistencies on Immediate and Delayed Probing Across Experimental Groups

	Passages					
Group I (n = 8)	'Snakes' (Explicit)[a]		'Ants' (Implicit)[b]		'Pigeons' (Explicit)	
	Immediate	Delayed[c]	Immediate	Delayed	Immediate	Delayed
Proportion of subjects detecting the inconsistencies	.500	.625	.500	.625	.625	.750

	Passages					
Group II (n = 8)	'Snakes' (Implicit)		'Ants' (Explicit)		'Pigeons' (Implicit)	
	Immediate	Delayed	Immediate	Delayed	Immediate	Delayed
Proportion of subjects detecting the inconsistencies	.375	.875	.875	.875	.750	.875

[a] Indicates that the inconsistency was explicitly stated in the passage.

[b] Indicates that the inconsistency was implicitly stated in the passage.

[c] This proportion includes subjects scored as detecting the inconsistency on the immediate probe.

passages. There is also a trend toward a greater proportion of the subjects noting the inconsistencies following continued probing.

The fact that not even on one of the passages did all the subjects detect the inconsistency is even more startling when it is recalled that Markman (1979) originally wrote these passages for elementary school children. In reviewing the responses of the subjects who did not initially detect the inconsistencies in these passages, it appears that these subjects were generally focusing on particular aspects of the passage such as grammar, sentence length, choice of words, topic etc., and were not monitoring the passage for its comprehensibility. These findings of the less than optimal listening comprehension monitoring performances of adults, and the impact of orientation to the passages on adult performances, are reminiscent of the findings of Tikhomirov and Klochko (1981). These results can also be interpreted as supporting Markman's (1979, 1981) proposition that the standard of evaluation plays a central role in efficient listening comprehension monitoring.

All of the adults who heard the explicitly consistent version of the 'Fish' passage correctly indicated that it made sense. However, only half of the subjects who heard the implicitly consistent version of this passage indicated that they thought it made sense. The adults who did not state that this passage made sense typically questioned the sentences that stated that fish at the bottom of the ocean smell their food and they only eat red fungus. On reflection the experimenter decided that this passage was inappropriate because of this problematic inferencing requirement (i.e., that red fungus has a particular smell), and it was dropped from further analyses.

The remaining discussion of the adult pilot study will focus on the data from the two experimental groups on the 'Snakes' passage. This approach is taken because it is proposed that the responses on this first passage represent the 'cleanest' (i.e., unconfounded by the effects of prior questioning) measures of spontaneous recall of passage details, and introspection of cognitive processes during initial passage presentation.

The memory for details data for the 'Snakes' passage were examined in an effort to determine if the listening comprehension monitoring performances of the adults could be accounted for by differential recall of story details. The memory protocols of subjects who initially detected the inconsistency (i.e., the inconsistency was stated in response to the first probe) were compared with the protocols of subjects who did not initially detect the inconsistency. While the actual number of subjects involved in these comparisons were very small, the intent was simply to determine if any trends were obvious in the data.

The mean proportions of total story details recalled for the explicitly inconsistent 'Snakes' passage was .557 for subjects that did initially detect the inconsistency, and .366 for subjects that did not detect the inconsistency initially. For the implicitly inconsistent 'Snakes' passage the mean proportions of total story details recalled was .472 for subjects who did initially detect the inconsistency, and .417 for subjects who did not initially detect the inconsistency. An examination of specific details recalled did not point to a particular recall configuration for subjects who did or did not initially detect the inconsistency.

Similar findings were revealed in examining the memory protocols for the other passages. Typically, the subjects who detected the passage inconsistency did recall a greater proportion of the story details (range .472 to .575) than the subjects who did not initially detect the passage inconsistency (range .167 to .475), but there was wide variability in the size of these differences (range .055 to .345), and no discernible patterns emerged across explicit and implicit passages. Thus, while these findings are merely suggestive, it would appear that differential memory for story details would not seem to be a plausible explanation for the differential listening comprehension monitoring performances of adults.

Of particular importance to the present research was the actual processes the efficient comprehension monitors reported engaging in to detect the passage inconsistencies. Recall that the passage was re-played and the subjects were requested to introspect regarding their cognitive processes when they first listened to the passage. In reviewing the subjects' answers to the request to introspect with regard to the explicitly inconsistent and implicitly inconsistent 'Snakes' passages, two salient features emerged from their answers:

(1) fourteen of the sixteen subjects reported extensive use of visual images while listening to the passage (it is interesting to note that the two subjects who did not report using visual images indicated that they were concentrating on specific details in the passages rather than integrating the material, and neither detected the inconsistency).

(2) all of the subjects who detected the passage inconsistency, either initially or after the memory or introspection, probes, (i.e., 12 of the 16 subjects) reported using a comparison process in which they compared incoming information and previously heard information in deciding that the passage did not make sense. None of the subjects who failed to detect the inconsistency reported the use of a comparison strategy.

In reviewing the responses to the introspection probe for the other inconsistent passages similar findings emerged.

Thus, based on this adult pilot study it was decided that a comparison strategy would be employed as the basic cognitive strategy in which children should be instructed in an effort to enhance their listening comprehension monitoring capabilities. It was also decided that an imagery strategy would be included in the training program for the children as adults reported extensive use of this strategy, even though at this point there was no direct evidence that it facilitated listening comprehension monitoring performances.

Children's Pilot Study

An extensive pilot study was conducted with grade three children in an attempt to discern the nature of the training program which would be sufficient to promote efficient listening comprehension monitoring capabilities. Grade three children were chosen for the pilot study because of their poor spontaneous performances on tasks requiring listening comprehension monitoring, and their unresponsiveness to task and instruction manipulations (Markman, 1979). Also, only explicitly inconsistent passages were used in an effort to simplify the focus of the instructional program.

The rationales for including specific elements in the training program came from diverse sources, but the model of metacognition with its attendant implications for training (as discussed previously) generally guided the selection of components. Based on the pilot work with adults in which the primary role played by a comparison strategy (i.e., cognitive strategy) was implicated, this component was included in the training package as the basic cognitive strategy. Imagery and rehearsal components were included to promote the active involvement of the subjects in processing the material, based on Markman's (1977) proposal of superficial processing of the material by young children. A general monitoring strategy of periodically assessing the sensibility of the passage was included as a metacognitive strategy. Finally, a self-instructional training format was adopted because of its perceived relationship to the higher order coordinating strategies as discussed previously.

In addition to the training group, the following control groups were included: (1) a group which was exposed to the training passages and told to 'listen' and 'think', and following each inconsistent training passage was provided with a complete explanation of the inconsistency. This group represents both an attentional control and a listening comprehension monitoring outcome knowledge control for the trained group; and (2) a group that received no training or exposure to the training passages, and was simply presented with the test stories. This group represents a control for the spontaneous performances of the children in the training condition.

Method

Subjects

Sixty third grade children, 29 girls and 31 boys, participated in this study. The mean age of the children was 8 years, 10 months with a range of 7 years, 11 months to 10 years, 6 months. The children were drawn from two elementary school in London, Ontario. Both schools were located in middle-class areas. The children were randomly assigned to one of three experimental conditions ($n = 20$), with the groups being approximately equated for sex, home classroom assignment and school of subjects.

Materials

The experimental materials consisted of six short animal stories, four of which were adapted from Markman (1979). Four of the passages contained explicit inconsistencies, while the remaining two passages were consistent. Randomly selected sets of three passages were used during training and at immediate testing, the only constraint was that each set contain two explicitly inconsistent passages and one consistent passage. The set 'Snakes' - inconsistent, 'Turtles' - consistent, and 'Giraffes' - inconsistent, was used during training. The set 'Fish' - inconsistent, 'Pigeons' - inconsistent, and 'Ants' - consistent, was used during immediate testing. One of the explicitly inconsistent passages employed in this pilot study is presented in Table 3, the remaining passages are reporduced in Appendix B.

Table 3

Example of Explicitly Inconsistent Passage

SNAKES

There are many different kinds of snakes. / Some snakes are 8 feet long and very fat. Some snakes are only 6 inches long and very skinny. / Some snakes have a poisonous bite, but some snakes are harmless and even help us. / The garden snake, for example, helps us by keeping bad insects away from our gardens. / Garden snakes eat these insects. They find the insects by listening for them. / The insects make a special noise. / Garden snakes do not have ears. / They cannot hear the insects. They can hear the sounds of the insects. / That is how they are always able to find the insects. /

Note: Slash marks indicate the parsing used to insert the 10 second pauses.

The passages were presented to the children via tape recorder, and had been recorded by an adult male. The passages were parsed such that after approximately every second sentence a ten second pause was inserted, and the two incompatible sentences were presented contiguously.

Procedure

The children were seen individually in a quiet room in their school, by an adult female experimenter. All the children received the same introduction to the experiment by being asked to act as consultants, and assist the experimenter in determining if the stories that were presented made sense. The experimenter informed all the subjects:

> "I have written some short stories about animals for grade three children. I would like you to help me by listening to these stories and telling me if everything makes sense. I need you to tell me if there is a part that doesn't make sense so that I can change it to make it easier for other children to understand."

Following this introduction, the experimenter asked each child if s/he understood the instructions, and requested that the child repeat what s/he felt was required of her/him. If the child failed to indicate that s/he understood that s/he had to tell the experimenter if any part of the stories did not make sense, the instructions were repeated. This comprehension check was included to ensure that all the children adequately understood the nature of the experimental task. Following this initial introduction and comprehension check, the children were randomly assigned to one of the following three experimental groups.

Active Comprehension Monitoring Instruction Group

Children in this instructional group were told that prior to listening to the stories to see if they made sense, the experimenter would show the child "a good way to listen to a story to be sure it makes sense" on three practice stories. The children were also informed of the nature of the parsing that was used when the stories were recorded (i.e., that they would hear a bit of the story and then there would be a pause before the next bit of story, etc.). The children were then instructed as follows:

> "I want you to listen carefully to each part of the story. After each part, what I want you to do is say the important information out loud in your own words, and then make a picture in your head of the information. That way you can keep track of the story and see if all the parts make sense."

Then the experimenter modeled the components of the active comprehension monitoring strategy for the child on the first training story, and on part of the second passage. The various components modeled by the experimenter included: (1) listening carefully to each part of the story which was modeled by the experimenter orienting towards the tape recorder and assuming an attentive posture; (2) saying the important information outloud after each part of the story was heard and making a picture of the information in her head. At this point, the experimenter showed the child a picture and indicated that it resembled the picture in her head; and (3) keeping track of the story to see if all the parts make sense. This was modeled by the experimenter monitoring the incoming information and comparing it to previously heard information by periodically asking "Does everything make sense so far?"

Reproduced below is the protocol employed by the experimenter for the first training passage "Snakes'. The numbers correspond to the pauses inserted in the passage (see Table 3 for the 'Snakes' passage).

1) "O.K. There are many different kinds of snakes. In my head I see all different kinds of snakes... snakes of different colours. The picture in my head looks something like this." (show picture)

2) "Snakes can come in many different sizes, long and fat, short and skinny. In my head I see snakes of different shapes and sizes. My picture looks something like this." (show picture)

3) "Some snakes can bite us, but some snakes help us. I see a snake biting someone's foot, and another helping someone. My picture looks something like this." (show picture) "Does everything make sense so far? -- yes."

4) "Garden snakes help us by keeping insects away. O.K. I see a garden snake keeping insects out of a garden." (show picture)

5) "Garden snakes listen for insects and when they hear them they eat them. I see a garden snake listening for an insect." (show picture)

6) "The insects make a special noise. I see an insect making a noise." (show picture) "Does everything make sense so far? Yes, the garden snake listens for the insects' special noise and when he hears it he catches it and eats it."

7) "Garden snakes do not have ears. O.K. I see a garden snake without ears." (show picture)

8) "Hm, this part is hard to make a picture of - it's confusing. First it says they cannot hear the insects then it says they can hear the insects. It doesn't make sense - if they don't have ears they can't hear the insects (show pictures of '?')"

9) "I don't know how the garden snake finds the insects if they don't have ears to hear them with." (show picture of '?')"

Following this first training passage the experimenter reiterated that the passage did not make sense, and reviewed the information presented in the passage focusing on the inconsistent sentences.

Prior to presenting the second training story, the experimenter reviewed the components of the active comprehension monitoring strategy, and encouraged and assisted the child in using the strategies on the second passage. For the third training story the experimenter again reviewed the components of the active comprehension monitoring strategy for the child. The child then performed these strategy components alone, with occasional prompting from the experimenter, while the third training story was played. Again, following these training passages, the experimenter explicitly pointed out the consistency or inconsistency to the child which constituted a review of comments made while listening to the passage. If the consistency or inconsistency of the passage was correctly noted by the child, the experimenter acknowledged the child's response but still made the concluding statement.

Comprehension Monitoring Outcome Knowledge Group

Children assigned to this second training group were instructed to "listen carefully to each part of the story and then think hard about it during the pause to see if it makes sense." The experimenter then modeled these strategies for the child while the first training story was presented by orienting toward the tape recorder and assuming an attentive posture. As with the children in the Active Comprehension Monitoring Instruction group, children in this group were encouraged to participate with the experimenter in listening to the second training story, and were employing the technique independently by the third training story.

At the end of each training story the experimenter stated for the child whether the story did or did not make sense, and stated her reasoning for reaching that conclusion. For example, for the first training passage ('Snakes' - inconsistent) the experimenter stated:

> "Hm, that doesn't make sense. First the story said garden snakes do not have ears. Then it said the garden snake cannot hear the insects, next it said the garden snake can hear the sounds of the insects. If the garden snake does not have ears, how does it hear the insects? That story doesn't make sense!"

Thus, this group is labeled the Comprehension Monitoring Outcome Knowledge group because the children were presented with a post hoc (as opposed to active) explanation of the comprehension monitoring strategy (i.e., implicit in the experimenter's summary statement of the comprehensibility of the passage is the notion that incoming information was compared with previously heard information). This group controlled for the attention and the knowledge provided to the subjects in the Active Comprehension Monitoring Instruction group.

Control Group

Children in the Control group did not receive any training or exposure to the training materials. They simply received the introduction to the experiment as outlined above, and an explanation of how the test stories would be presented.

Following training for the two trained groups, and upon completion of the introductory comments for the control group, all the children were presented with the test stories. Children in the two training groups were reminded, prior to hearing each test passage, to use the strategy used during training to see if the stories made sense. Children in the control group were simply told to "listen carefully to each story to see if it makes sense".

Dependent Measures

Following the presentation of each test story the children were asked a series of questions concerning the story to determine:

1) whether the child noted any inconsistency in the story, and whether s/he could provide an adequate explanation of this judgment;
2) whether the child could correctly identify a consistent passage; and
3) the child's unaided recall of the story details.

These three measures formed the dependent measures for this pilot study.

Scoring

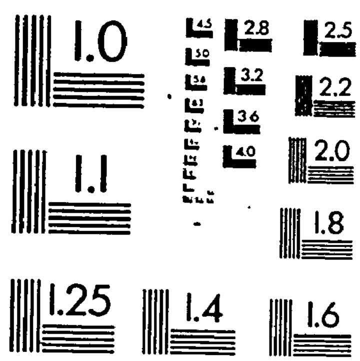
The dependent measures were scored as follows:

1) Detection of Inconsistency - a child was assigned a score of 1 if s/he correctly stated that an inconsistent story did not make sense and was able to give an adequate explanation (i.e., specify the sentences that were inconsistent), all other responses were scored 0.
2) Detection of Consistency - a child was assigned a score of 1 if s/he indicated that the consistent passage made sense. All other responses were scored 0.
3) Unaided Recall of Story Details - each of the test stories was broken down into specific idea units based on the ratings of a sample of graduate students. The number of idea units contained in each story ranged from eight to eleven. The subjects' recall protocols were scored for the total number of idea units they contained.

Results and Discussion

The children's pilot study was conducted to determine the nature of the training program that would promote optimal listening comprehension

2



monitoring performances by the grade three children. Three sets of pairwise comparisons were specified a priori, for each dependent measure. The error rate was preset at $\alpha = .09$ for each set of comparisons, and $\alpha = .03$ per comparison. Thus, the error rate for this three group study falls in between that of a 4 group 2 x 2 ANOVA design (total $\alpha = .15$, $\alpha = .05$ per effect) and a two group study ($\alpha = .05$).

Table 4 presents the findings of primary interest, the proportion of children detecting the inconsistencies in the test passages across the experimental conditions. Planned comparisons of the proportions (Marascuilo & McSweeney, 1977) revealed that for the first inconsistent passage (i.e., 'Fish'), a significantly greater proportion of children in both the Active Comprehension Monitoring Instruction and Comprehension Monitoring Outcome Knowledge groups detected the inconsistency than the children in the Control group. There was no significant difference between the proportion of children in the Active Comprehension Monitoring Instruction group versus the proportion of children in the Comprehension Monitoring Outcome Knowledge group who detected the inconsistency.

For the second inconsistent test passage (i.e., 'Pigeons'), a significantly greater proportion of subjects in the Active Comprehension Monitoring Instruction group detected the inconsistency compared with the proportion of Control subjects that correctly identified the problem. The proportion of subjects in the Comprehension Monitoring Outcome Knowledge group that detected the inconsistency was not significantly different from the proportion of subjects in either the Control or Active Comprehension Monitoring Instruction group who detected the inconsistency. However, the data definitely indicates a

Table 4

Proportion of Children in the Experimental Groups

Detecting the Inconsistencies in the Test Passages

Experimental Groups	Passages Fish	Pigeons
Active Comprehension Monitoring Instruction	.55	.70
Comprehension Monitoring Outcome	.70	.60
Control	.05	.30

Note: n = 20 per condition.

trend in the direction of greater detection of the inconsistency by subjects in the Comprehension Monitoring Outcome Knowledge group than the Control group.

The large increase across the two test passages in the proportion of Control subjects who detected the inconsistencies is curious. An examination of these stories indicates that the two inconsistencies may not be equivalent. The inconsistency in the 'Fish' passage requires a comparison of the incompatible sentences with a series of previously heard sentences to detect the inconsistency. On the other hand, the inconsistency in the 'Pigeon' passage can be detected by simply noting two contiguously presented sentences that negate each other. It may be the case that the inconsistency in the 'Pigeon' passage is easier for the children to detect. Therefore, equivalence of the inconsistencies will be controlled for in the proposed research.

Table 5 presents the proportion of children in the three experimental groups that detected the inconsistencies in both passages. This data again illustrates the superiority of the Active Comprehension Monitoring Instruction and Comprehension Monitoring Outcome Knowledge groups relative to the Control group. A significantly greater proportion of the children in the Active Comprehension Monitoring group and the Comprehension Monitoring Outcome group detected the inconsistencies in both passages compared with the Control group. The difference between the proportion of subjects in the Active Comprehension Monitoring Instruction and Comprehension Monitoring Outcome Knowledge groups that detected both inconsistencies is not significant.

Table 5

Proportion of Children in the Experimental Groups

Detecting Inconsistencies in Both Test Passages

Experimental Groups	Proportion
Active Comprehension Monitoring Instruction	.45
Comprehension Monitoring Outcome	.55
Control	.00

Note: n = 20 per condition.

While the data presented thus far points to the superiority of the Active Comprehension Monitoring Instruction and Comprehension Monitoring Outcome Knowledge groups in enhancing the listening comprehension monitoring capabilities of young children, it is still necessary to rule out a differential memory for story details explanation of the findings. It could be argued that the imagery and rehearsal components of the instructional program received by the children in the Active Comprehension Monitoring Instruction group, and the exposure to experimental materials and instruction to 'listen' and 'think' by the children in the Comprehension Monitoring Outcome Knowledge group resulted in superior recall of story details, thus facilitating detection of the inconsistencies by these two groups. Alternatively, it could be argued that the poor performances of the Control group were simply due to these children's poorer recall of story details (i.e., they did not recall the prior information when the inconsistent sentence was presented). Table 6 presents the mean recall scores of story details of both inconsistent passages across the experimental groups. Dunn's multiple comparison procedure was used to make all planned comparison between the story detail recall means across experimental groups for both passages (Kirk, 1968). None of the differences between the story detail recall means for the three experimental groups were significant for either passage.

As indicated previously, the stories were written such that the first part of the passage presented information that was irrelevant to the inconsistency. It could be the case that the children in the Active Comprehension Monitoring Instruction and the Comprehension Monitoring Outcome Knowledge groups were alerted, through training, to focus on the

Table 6

Total Recall Scores for Story Details on Inconsistent Passages Across Experimental Conditions

Experimental Groups	Passages: Fish[a] $\bar{x}$	s.d.	Pigeons[b] $\bar{x}$	s.d.
Active Comprehension Monitoring Instruction	3.800	1.473	4.800	1.642
Comprehension Monitoring Outcome Knowledge	3.350	1.387	4.500	1.821
Control	3.350	1.089	4.200	1.005

Note: n = 20 per condition.

[a] A total of 8 details were scored for in this passage.

[b] A total of 10 details were scored for in this passage.

last part of the story (i.e., where the inconsistency was presented). In an attempt to rule out this explanation of the present findings, adult raters (two graduate students in developmental psychology) rated the two test stories for details relevant to the inconsistencies, and the children's recall of story details were broken down into the number of relevant details they recalled. Table 7 presents the mean recall of details relevant to detection of the inconsistencies in the two passages across the experimental groups. Dunn's multiple comparison procedure was again used to make all planned comparisons between the relevant story detail recall means across the experimental groups for both passages. As with the total story detail recall means discussed previously, none of the differences between the relevant story detail recall means for the three experimental groups were significant for either passage.

Table 8 presents the proportion of children in each group who exhibited perfect monitoring performances. Perfect monitoring was defined as correctly identifying and providing appropriate justifications for the two inconsistent passages, and indicating that the consistent passage did make sense. None of the Control group children exhibited perfect monitoring performances. However, only five and seven of the children in the Active Comprehension Monitoring Instruction and Comprehension Monitoring Outcome Knowledge, respectively, demonstrated this optimal level of performance. Planned proportional analyses were completed with this data, and the only significant finding was a greater proportion of children in the Comprehension Monitoring Outcome Knowledge group exhibited perfect monitoring compared to the Control group. The difference between the

Table 7

Recall of Details Relevant to the Detection of the Inconsistencies in the Inconsistent Test Passages Across Experimental Conditions

Experimental Groups	Fish[a] $\bar{x}$	Fish[a] s.d.	Pigeons[b] $\bar{x}$	Pigeons[b] s.d.
Active Comprehension Monitoring Instruction	1.750	.967	2.550	.826
Comprehension Monitoring Outcome Knowledge	1.350	1.040	2.150	1.309
Control	1.800	1.005	2.250	.967

Note: n = 20 per condition.

[a]A total of 4 relevant details were scored for in this passage.

[b]A total of 6 relevant details were scored for in this passage.

Table 8

Proportion of Perfect Monitors Across Experimental Conditions

Experimental Groups	Proportion
Active Comprehension Monitoring Instruction	.25
Comprehension Monitoring Outcome Knowledge	.35
Control	.00

Note: n = 20 per condition.

proportions of perfect monitors in the Active Comprehension Monitoring Instruction group and the Control group just missed significance. While these findings reinforce the superiority of the two training conditions relative to the control groups, they also underline the need for a more potent instructional intervention to maximize the number of perfect monitors.

The children in both the Active Comprehension Monitoring Instruction and Comprehension Monitoring Outcome Knowledge groups demonstrated superior and generally comparable performances relative to the Control group, therefore, the instructional components of these experimental groups were compared in an attempt to distill the commonalities so that they could be included in an instructional package designed to promote optimal listening comprehension monitoring performance. Table 9 presents a comparison of the instructional components of the Active Comprehension Monitoring and the Comprehension Monitoring Outcome Knowledge groups. It appears that the elements that these two groups have in common revolve around the handling of an inconsistency and include: 1) a statement indicating which sentences are incompatible; and 2) an explanation that these sentences are inconsistent with previously presented information; and 3) implicit in this explanation is the notion that detecting inconsistencies involves comparing the incompatible sentences with previously heard information.

The main difference between the two groups in terms of these components lies in when they were presented. In the Active Comprehension Monitoring Instruction group the subjects were instructed in the processing of the inconsistency immediately following the presentation of the inconsistency. The children in the Comprehension

Table 9

Comparison of the Instructional Components of the

Active Comprehension Monitoring Instruction

and Comprehension Monitoring Outcome Knowledge Groups

Active Comprehension Monitoring Instruction		Comprehension Monitoring Outcome
	- introduction to the experiment - exposed to 3 practice stories and told they will be shown a good way to listen to the stories to see if they make sense - told to listen carefully to each part of the story	
- told that after each part of the story 1) say important information outloud 2) make a picture of the information in your head		- told to think hard during the pause
	- given general instruction to monitor to see if the story makes sense	
<u>First Training Passage</u> Experimenter demonstrates 1) saying the important information outloud 2) making a picture of the information in her head for each part of the passage 3) comparison of incoming information with previously heard information and assessing understanding by periodically asking "Does everything make sense so far?" 4) when the inconsistency is encountered the experimenter a) makes a statement that the sentences are incompatible b) explains that the sentences do not make sense in the context of prior information 5) at the <u>end</u> of the passage makes a statement that the story did not make sense		<u>First Training Passage</u> Experimenter demonstrates 'Listening' and 'Thinking' for each part of the passage - at the <u>end</u> of the passage the experimenter 1) makes a statement that the story did not make sense 2) statement of the sentences that are incompatible 3) explanation that the sentences do not make sense in the context of prior information 4) final statement that the story did not make sense
<u>Second Training Passage</u> Experimenter again models the components listed above and encourages and assists the child in employing the trained strategies and evaluating the passage		<u>Second Training Passage</u> Experimenter models 'listening' and 'thinking' and encourages and assists the child in employing these strategies and evaluates the passage at the end of the presentation
<u>Third Training Passage</u> Child performs all the instructional components independently with occasional assistance from the experimenter		<u>Third Training Passage</u> Child performs independently and the experimenter evaluates the passage at the end

Monitoring Outcome Knowledge group were instructed in how the inconsistency was processed after the entire passage had been presented. The slightly superior performances of the children in the Active Comprehension Monitoring Instruction group, (i.e., in detecting inconsistencies), is interpreted as evidence for the effectiveness of an active approach to instructing children in efficient listening comprehension monitoring.

The imagery and rehearsal elements of the Active Comprehension Monitoring Instruction instructional package appear to add little to the performance of these children over the subjects in the Comprehension Monitoring Outcome Knowledge group. This conclusion is also supported by the fact that including these components did not enhance the recall performances of the children in the Active Comprehension Monitoring Instruction group.

Taken together the findings of this pilot study, and the analysis of the instructional components of the Active Comprehension Monitoring Instruction and Comprehension Monitoring Outcome groups, are interpreted as indicating that the emphasis in the instructional package of the proposed research should be on: 1) an active demonstration of effective listening comprehension monitoring; 2) inclusion of the comparison strategy (i.e., comparing new information to previously heard information) as the basic cognitive strategy; and 3) explicitly stating the inconsistent sentence, and indicating that the inconsistency is a result of the imcompatibility of the sentence with previously presented information.

Limitations

This study was intended solely as a pilot study with the primary aim of determining the nature of the instructional components involved in promoting efficient listening comprehension monitoring performances in young children. However, it contains many limitations (beyond the obvious methodological limitations) which will need to be overcome in the proposed research. The most glaring limitation that became apparent during this pilot study was the need for all components of the training to be made explicit to the children including: a) providing an explicit standard of evaluation for the children which involves giving them a definition and examples of what makes sense, and what does not make sense; b) making the comparison strategy explicit prior to demonstrating the implementation of the strategy; c) making the monitoring strategy clear by having the children check back through the story and ask "Does everything make sense so far?", after each part of the story is heard; and d) presenting and reviewing all instructional components before demonstrating them. Also, it was apparent that additional passages, that were equated for length, position and nature of the inconsistency, familiarity of the passage topic, etc., would be needed for the study proper to provide more passages for use during training and maintenance testing.

Thus, both the Adult's and Children's pilot studies provided solid groundwork for the study that forms the main focus of this dissertation.

PRESENT STUDY

The purpose of this study was to design an instructional program for grade three children to promote the acquisition and maintenance of efficient listening comprehension monitoring performances in the context of a learning situation. In previous work Markman and Gorin (1981) provided an appropriate standard of evaluation to listeners who were subsequently exposed to inconsistent expository material. This enhanced the listening comprehension monitoring performances of young children to a limited degree. The approach taken in the present program of research was to uncover the nature of the cognitive processes involved in the successful application of this standard during listening comprehension monitoring, and use this as a basis for designing an instructional program to promote efficient listening comprehension monitoring performances in grade three children.

The listening comprehension monitoring program developed for this study was based on theory regarding the nature of metacognition, and extensive pilot work aimed at illuminating the nature of the cognitive processes involved in listening comprehension monitoring. According to the model of metacognition which has guided this research, three types of strategies are invoked by sophisticated thinkers during cognitive endeavors: 1) basic cognitive strategies as well as knowledge about those strategies (i.e., how, where, when and why the strategies are appropriate); 2) metacognitive strategies to monitor and regulate the implementation of the cognitive strategy or strategies; and 3) higher order control strategies that oversee and integrate the application of the cognitive and metacognitive strategies. In pilot work with adults and children I determined that the three task-specific analogous strategies involved in detecting inconsistencies in oral passages include: 1) a comparison strategy (i.e., comparing sentences to determine if they are consistent) as the basic cognitive strategy; 2) a monitoring strategy which involves checking back to see if 'previously heard' information is consistent with 'just heard' information as the metacognitive strategy; and 3) a self-instruction training approach (Meichenbaum and Goodman, 1971) which embodies the functions ascribed to the higher order control strategies, and promotes maintenance over time. It was hypothesized that grade three children exposed to an appropriate standard of evaluation in conjunction with this three tiered instructional package would demonstrate, relative to children simply provided with the standard, significantly improved acquisition and maintenance (i.e., over a 6-8 day delay period) of efficient listening comprehension monitoring skills.

In this study the various combinations of instructional components that were examined included: comparison training; comparison plus monitoring training; comparison plus monitoring plus self-instructional training; and passive provision of knowledge concerning the comprehensibility of the training passages that was equivalent to that generated by the latter training group. In addition, four comparison groups were included to control for: spontaneous improvement in the children's performance; provision of an appropriate standard of evaluation; exposure to the training passages; and provision of an appropriate standard of evaluation plus exposure to the training passages. The inclusion of the eight groups allowed five questions to be addressed both at immediate maintenance and delayed maintenance testing:

1) Does the provision of an appropriate standard of evaluation facilitate listening comprehension monitoring performance relative to uninformed presentation of the maintenance passages? That is, does Markman and Gorin's (1981) finding replicate?

2) Does the provision of an appropriate standard of evaluation facilitate listening comprehension monitoring performance relative to exposure to the training materials alone?

3) Does the provision of an appropriate standard plus exposure to the training materials facilitate performance relative to the provision of a standard alone?

4) Does providing children with an appropriate standard of evaluation and comprehension monitoring-outcome knowledge enhance performance relative to the provision of an appropriate standard alone?

5) What components (i.e., training in comparison, monitoring or self-instruction strategies) can be included in an instructional package, over and above the provision of an appropriate standard of evaluation, to facilitate efficient listening comprehension monitoring performances?

Efficient listening comprehension monitoring was defined in two ways in the present study. Markman and her colleagues (e.g., Markman, 1979; Markman & Gorin, 1981) presented children with passages that contained inconsistencies, and used detection of inconsistencies as the sole index of listening comprehension monitoring performance. The present study incorporates a methodological modification of Markman's original procedure that allows for a finer level of analysis of the children's listening comprehension monitoring performances. In the present study the children were presented both inconsistent and consistent passages, therefore it was possible to examine the children's ability to discriminate comprehensible from incomprehensible passages. Thus, a continuum of listening comprehension monitoring measures was employed in the present study progressing from a gross to a finer level of analysis, and include: inconsistencies detected; quality of judgments on inconsistent passages (i.e., number of relevant propositions cited); total comprehension monitoring scores (i.e., based on the combined performance on the inconsistent and consistent passages; and perfect monitoring (i.e., detecting all inconsistent and consistent passages).

Data on memory of inconsistent passages was gathered to examine the relationship between memory for story details and detection of inconsistencies. Other measures were collected to assess the nature of the metacognitive knowledge generated by the children in the different experimental groups. These included determining the children's understanding of the concept of sense; assessing the strategy or strategies used to monitor comprehension of passages; and testing for generalization of comprehension monitoring strategies to other tasks.

METHOD

Subjects

One hundred and ninety-two third grade children, 96 boys and 96 girls, participated in this study. The mean age of the children was 8 years and 8 months, with a range = 7 years, 8 months to 10 years, 4 months. The children were drawn from five elementary schools in London, Ontario. The schools were located in middle-class and lower-middle-class areas of London. The children were randomly assigned to one of the eight experimental conditions (n = 24 per condition), except that conditions were balanced with respect to sex, classroom assignment, and school of the subjects.

Materials

Experimental passages. The experimental materials were thirteen expository passages, modeled after Markman (1979). All passages were fourteen sentences in length and were written at grade three reading level (Gunning, 1968). Passage content was derived from nature and science books appropriate for elementary school children. Animal facts and habits were chosen for the experimental passages to create a school-like passage which required that the children monitor their understanding of new, factual information. In addition, science stories were chosen to remove any element of fantasy from the children's perceptions of the stories.

Table 10 contains one of the explicitly inconsistent passages that was employed. All inconsistent passages conformed to the following format:

1) the initial parts of the story (sentences 1a through 3b) were irrelevant to the inconsistency;

2) sentences 5a through 6a contained complementary or consistent information, while sentence 6b contained information inconsistent with sentences 5a through 6a;

3) a consistent passage could be created by substituting a sentence for 6b that was consistent with the information contained in sentences 5a through 6a (e.g., for the 'Sea horses' passage the sentence that could

Table 10

Example of Explicitly Inconsistent Passage

	Seahorses
1a.	The sea horse is a fascinating fish.
1b.	Sea horses are found in oceans and seas.
2a.	Sea horses are very small.
2b.	Sea horses grow to be twelve centimeters long.
3a.	The sea horse's head looks like a tiny horses's head.
3b.	The sea horse has a small body and a long tail.
4a.	When the sea horse swims it looks like it is standing on its tail.
4b.	It moves through the water by moving fins on its head and back.
5a.	The sea horse is not a very fast swimmer.
5b.	It makes jerky movements as it swims.
6a.	The sea horse moves slowly through the water.
6b.	The sea horse escapes enemy fish by quickly swimming away.
7a.	That is how the sea horse keeps from being eaten by other fish.
7b.	That's the story about sea horses.

be substituted for 6b was 'The sea horse escapes enemy fish by hiding in the seaweed').

From an initial pool of twenty-four passages, thirteen were selected according to the following criteria:

1) grade three children should be familiar with the appearance of the animal that is the topic of the passage;

2) grade three children should not know the correct information to resolve the inconsistency (i.e., if that were the case, the task would reduce to matching the information contained in sentence 6b with their prior knowledge (cf., Ackerman, 1982 a,b) rather than monitoring their comprehension of the passage);

3) grade three children should be able to read the passage without difficulty, and therefore should experience no difficulty listening to the story;

4) the passage format (as outlined above) was confirmed by five advanced graduate student.

See Appendix C for a detailed discussion of the operationalization of the various passage validation measures as well as the specific criteria used to select the experimental passages. See Appendix D for the thirteen stories used during training and maintenance.

A set of five passages was employed during training and the remaining eight passages were used during immediate and delayed testing. The first two passages of the set of five training passages were fixed across all subjects both in terms of passage topic and version (i.e., explicitly inconsistent). Each child also heard a randomly chosen set of three passages selected from nine possible presentation orders of passage topic by passage version (i.e., one inconsistent and two consistent) combinations. (See Table 11 for a listing of the passage combinations employed during training.)

Of the eight passages used to assess immediate and delayed maintenance, half of the children assigned to each group heard one set of four passages during immediate testing and the remaining set of four passages during delayed testing. For the remaining children in each group this sequence was reversed. Three of the passages used to assess immediate or delayed maintenance were presented as explicitly inconsistent, while the consistent version of the remaining passage was presented. The final passage presented to the subjects during immediate and delayed testing was fixed both in terms of topic and passage version (i.e., explicitly inconsistent). This final passage was fixed because following this story, a standard interview (to be discussed subsequently) was conducted with the subjects which required answers based on this passage. For the remaining three maintenance passages, nine combinations of passage topic by passage version (i.e., two inconsistent and one consistent) combinations were generated, and each child was exposed to a randomly chosen set of these passages (see Table 11 for a listing of maintenance passage combinations).

Thus, for each subject a selection of training (given that he/she was exposed to training passages) and immediate and delayed maintenance passages was randomly chosen, without replacement, from the possibilities listed in Table 11. All the passages were presented to the children on audiotape, recorded in an adult male voice. The stories were parsed such that eight ten second pauses were inserted (i.e., following the title and every two sentences) when the passages were recorded. Thus, for all the inconsistent passages two incompatible sentences (i.e., 6a and 6b) were presented contiguously.

Table 11

Passage Topic by Passage Version Combinations

Employed During Training and Maintenance Testing

TRAINING

Passages

1. Sea horses (S)
2. Giraffes (G)
3. Chipmunks (C)
4. Skunks (Sk)
5. Owls (O)

Passage Topic by Passage Version Combinations

1. S-I, G-I, C-C, Sk-C, O-I
2. S-I, G-I, Sk-C, O-C, C-I
3. S-I, G-I, O-C, C-C, Sk-I
4. S-I, G-I, C-C, Sk-I, O-C
5. S-I, G-I, Sk-C, O-I, C-C
6. S-I, G-I, O-C, C-I, Sk-C
7. S-I, G-I, C-I, Sk-C, O-C
8. S-I, G-I, Sk-I, O-C, C-C
9. S-I, G-I, O-I, C-C, Sk-C

MAINTENANCE TESTING

Passages - Set 1

1. Fish (F)
2. Pigeons (P)
3. Alligators (A)
4. Elephants (E)

Passage Topic by Passage Version Combinations - Set 1

1. F-I, P-I, A-C, E-I
2. P-I, A-I, F-C, E-I
3. A-I, F-I, P-C, E-I
4. F-I, P-C, A-I, E-I
5. P-I, A-C, F-I, E-I
6. A-I, F-C, P-I, E-I
7. F-C, P-I, A-I, E-I
8. P-C, A-I, F-I, E-I
9. A-C, F-I, P-I, E-I

Passages - Set 2

1. Camels (C)
2. Racoons (R)
3. Swans (S)
4. Gorillas (G)

Passage Topic by Passage Version Combinations - Set 2

1. C-I, R-I, S-C, G-I
2. R-I, S-I, C-C, G-I
3. S-I, C-I, R-C, G-I
4. C-I, R-C, S-I, G-I
5. R-I, S-C, C-I, G-I
6. S-I, C-C, R-I, G-I
7. C-C, R-I, S-I, G-I
8. R-C, S-I, C-I, G-I
9. S-C, C-I, R-I, G-I

I - Inconsistent

C - Consistent

Experimental interview. A structured interview with each child was taped during the assessment of immediate and delayed maintenance. The interview consisted of a series of questions that probed information concerning the following measures:

1) LISTENING COMPREHENSION MONITORING - Following each of the four passages used to assess immediate and delayed maintenance, the child was asked "Did this story make sense?". Two probes were used to elicit clarification of unclear answers on inconsistent passages. The child was asked "Why?" if s/he failed to provide a rationale for judging a story to be inconsistent. The child was asked "What part didn't make sense?" if s/he failed to indicate which parts of the story s/he found to be inconsistent. Obviously, the correct answer to the question for the consistent passage was simply "Yes". However, if a child stated that a consistent passage did not make sense, the same probes were used to determine the basis of this judgment.

2) RECALL OF INCONSISTENT PASSAGE - As indicated previously the final passage presented during immediate and delayed recall was fixed both in terms of passage topic and version (i.e., either 'Elephants' - inconsistent or 'Gorillas' - inconsistent). Each child was asked to recall everything s/he could remember from this passage. When the child indicated that s/he could not remember anything else, the experimenter prompted the child to recount anything else s/he could remember from the story.

3) STRATEGY USE - Two questions were used to elicit information concerning the strategy or strategies used by the child while listening to the final maintenance passage. Initially the child was asked, "How did you listen to the story about ______ to see if it made sense?"

Following this, the child was presented a copy of the final passage that s/he heard. After the title and each sentence pair (i.e., where the pauses were inserted in the taped story) the child was asked to tell the experimenter what s/he did to determine if the story made sense after s/he heard that particular part of the story.

4) UNDERSTANDING OF THE CONCEPT OF SENSE - To assess criteria for judging comprehensibility, the children were asked the following two questions: 1) "How do you know when a story does not make sense?"; and 2) "Give me an example of something that does not make sense."

5) DISCRIMINATIVE COMPREHENSION MONITORING - The purpose of this measure was to determine if the child would also monitor her/his understanding on tasks besides the experimental tasks, and whether s/he could distinguish situations that required monitoring from situations that did not. One task selected for the discriminative comprehension monitoring measure was reading comprehension. The child was presented a story (Dahl, 1970) printed on one page. For the situation that required comprehension monitoring the child was asked, "What would you do if I asked you to read this story to find any sentences that do not belong in the story?" The non-monitoring situation was presented in the following question: "What would you do if I asked you to find any spelling mistakes in the story?"

The second discriminative monitoring task was adapted from the referential communication literature. The child was presented with an 8" x 10" white sheet of paper on which were drawn, from left-to-right, a small pink-striped triangle, a small pink-striped circle and a large blue-striped triangle. The monitoring situation was presented in the question "What would you do if I asked you to point to the striped triangle?" The non-monitoring situation was presented in the question "What would you do if I asked you to remember the designs on this card?" During immediate and delayed maintenance each child was presented with one discriminative monitoring task. Half the children in each group were presented the reading comprehension task at immediate testing and the referential communication task at delayed testing, this order was reversed for the remaining subjects. The order of the monitoring and non-monitoring questions was counterbalanced across subjects.

The children were given no feedback concerning their answers to the experimental interview.

Procedure

Children were seen for two sessions. In session one the children were trained or received control instructions, depending on group assignment, followed by an assessment of immediate maintenance. Session one lasted 30 to 75 minutes depending on condition. Session two was conducted six to eight days following session one, and was used to administer tests of delayed maintenance. Session two lasted approximately 30 minutes. A female experimenter saw the children on both occasions in a quiet room in the school. The procedures for sessions one and two are described below. To facilitate the presentation of the experimental manipulations they have been summarized in Table 12. Periodic reference to this table will hopefully make the written descriptions of the experimental groups easier to assimilate.

Session One

Each child was seated at a desk directly across from the experimenter. A tape recorder used to present passages was on the desk

Table 12

Instructional Components of Each Experimental Condition

Experimental Groups	INSTRUCTIONAL COMPONENTS: Introduction	Appropriate Standard of Evaluation	Exposure to Training Passages	Comparison Training	Monitoring Training	Complete Comprehension Monitoring Knowledge[a]	Self-Instruction Training
Posttest Only	■	□	□	□	□	□	□
Story Exposure	■	□	■	□	□	□	□
Appropriate Standard	■	■	□	□	□	□	□
Appropriate Standard + Story Exposure	■	■	■	□	□	□	□
Comprehension Monitoring Outcome Knowledge	■	■	■	□	□	■	□
Comparison Training	■	■	■	■	□	□	□
Comparison + Monitoring Training	■	■	■	■	■	■	□
Comparison + Monitoring + Self-Instruction Training	■	■	■	■	■	■	■

[a]Complete comprehension monitoring knowledge refers to the fact that the four relevant sentences (i.e., three that are consistent with each other and the one that is inconsistent with the previous three) are cited in justifying that the passage is inconsistent.

in front of the child. All children were asked to act as consultants, and to assist the experimenter in determining if the stories were they were to hear made sense. The children received the following introduction to the experiment:

> "I have some tapes I want you to listen to. They are tapes of short science stories about animals for grade three children. When I turn on the tape recorder you will hear each story part by part. After each part there will be a short pause until you hear the next part of the story. You will hear a bit of the story and then a pause, and then another bit of the story, and then another pause and so on. Do you know what a pause is? [If the child indicated s/he did not know what a pause was, s/he was told it is a short time when there is silence on the tape.] I would like you to help me by listening to these stories and telling me if everything makes sense. I need you to tell me if there is a part that doesn't make sense so that I can change it to make it easier for other grade three children to understand."

Following this introduction, a comprehension check was made to ensure that all children understood the experimental task. Each child was asked if s/he understood the instructions and was required to repeat what was required of her/him. If a child failed to indicate that s/he understood and that s/he was to tell the experimenter if any part of a story did not make sense, the instructions were repeated. No child required more than two repetitions of the instructions.

Children then received different treatment depending on condition. The conditions were 1) Posttest Only Control, 2) Story Exposure Control, 3) Appropriate Standard of Evaluation Control, 4) Appropriate Standard of Evaluation and Story Exposure Control, 5) Comparison Training, 6) Comparison + Monitoring Training, 7) Comparison + Monitoring + Self-Instruction Training, and 8) Comprehension Monitoring Outcome Knowledge Control. The first four groups are control groups and received no formal training. The remaining groups received various degrees of training.

Control Group Procedures

Posttest Only Control. Following the introduction, immediate maintenance testing was completed with the subjects in the Posttest Only Control group.

Story Exposure Control. Exposure Control children heard five training passages and were instructed to "practice listening to these stories to see if they make sense." No evaluations of the training passages were solicited by the experimenter. However, if the child correctly noted an inconsistency in a training passage, or stated a consistent passage was consistent, s/he was informed that s/he was correct. The experimenter replied "You are working very hard" to any incorrect assessments of the passages made by the children. Following this exposure to the training stories, the children were presented the immediate maintenance passages.

Appropriate Standard of Evaluation Control. Children in this condition were given a standard or criterion for evaluating the stories. Thus, this group was modeled after Markman and Gorin's (1981) experimental group that was provided a standard of evaluation. Following the introduction to the experiment, these children were asked to provide the experimenter with an example of something that did not make sense. If the child gave an appropriate example (i.e., conflicting or contradicting sentences) s/he was told s/he was correct. However, if the child gave an inappropriate example (e.g., nonsense sentence such as "I wanna go hockey" or a falsehood "Pigs can fly") the experimenter distinguished her/his example from the concept of sense that was to be employed in evaluating the stories. Then, all children, regardless of their example, were told the definition of sense and given a standard to judge the sensibility of the experimental passages (adapted from Markman & Gorin, 1981):

> "Let's talk about what it means when a story does not make sense. Stories do not make sense when all the sentences do not go together. For example, suppose you heard in one of the stories 'squirrels love lettuce', then later you heard 'squirrels hate lettuce.' Those two sentences do not go together. When sentences do not go together then the story does not make sense. Suppose one part of the story said 'bears are friendly animals' then another part of the story said 'bears are ferocious animals.' It would be confusing to have two sentences that do not go together

1) STRATEGY EXPLANATION - The experimenter initially described the strategy to be employed in listening to and judging the training stories. This explanation was repeated twice for the child.

2) INITIAL COMPREHENSION CHECK - Following strategy explanation, the experimenter questioned the child to determine if s/he fully understood the strategy that was to be employed. Following this, a yellow acetate sheet with strategy cues printed in black ink was placed in front of the child to prompt appropriate strategy usage.

3) MODELING OF STRATEGY AND SUMMARY EVALUATION - After reviewing the strategy, the experimenter modeled its implementation on the first training passage. In addition, the experimenter provided the child with a summary evaluation of the passage which included: (a) a statement regarding the sensibility of the passage; (b) a recapitulation of the inconsistent sentences; and (c) an assessment of the listener's state of knowledge.

4) GRADUAL INVOLVEMENT OF THE SUBJECT ON THE SECOND PASSAGE - Prior to presentation of the second training passage, the strategy was reviewed and the experimenter encouraged the child to employ the strategy, and generate the summary evaluation.

The first four sequential steps were repeated for every strategy included in instruction. Thus, children in the Comparison Training condition went through this sequence once, while children in the Comparison + Monitoring condition repeated it twice. Comparison + Monitoring + Self-Instruction subject repeated the sequence three times. Also, instruction on a given component on the first two training passages was identical across training conditions. That is, all children given comparison training received the same instruction on the

1) STRATEGY EXPLANATION - The experimenter initially described the strategy to be employed in listening to and judging the training stories. This explanation was repeated twice for the child.

2) INITIAL COMPREHENSION CHECK - Following strategy explanation, the experimenter questioned the child to determine if s/he fully understood the strategy that was to be employed. Following this, a yellow acetate sheet with strategy cues printed in black ink was placed in front of the child to prompt appropriate strategy usage.

3) MODELING OF STRATEGY AND SUMMARY EVALUATION - After reviewing the strategy, the experimenter modeled its implementation on the first training passage. In addition, the experimenter provided the child with a summary evaluation of the passage which included: (a) a statement regarding the sensibility of the passage; (b) a recapitualation of the inconsistent sentences; and (c) an assessment of the listener's state of knowledge.

4) GRADUAL INVOLVEMENT OF THE SUBJECT ON THE SECOND PASSAGE - Prior to presentation of the second training passage, the strategy was reviewed and the experimenter encouraged the child to employ the strategy, and generate the summary evaluation.

The first four sequential steps were repeated for every strategy included in instruction. Thus, children in the Comparison Training condition went through this sequence once, while children in the Comparison + Monitoring condition repeated it twice. Comparison + Monitoring + Self-Instruction subject repeated the sequence three times. Also, instruction on a given component on the first two training passages was identical across training conditions. That is, all children given comparison training received the same instruction on the first two training passages. The remaining two steps in the instructional sequences were as follows:

5) INCREASING INVOLVEMENT OF THE CHILD - Prior to the presentation of the three remaining training passages, the experimenter helped the child review the strategy or strategies that were to be employed. The child's participation was increased across the remaining passages and her/his use of overt verbal prompts was faded to a covert level. By the fifth training passage the child employed the strategy or strategies independently and silently. S/he also generated the summary evaluation without assistance.

6) FINAL COMPREHENSION CHECK - After practicing the strategy or strategies on the fifth training passage and generating the summary evaluation, strategy prompts were removed and the child was asked to describe the trained strategy or strategies.

I will now turn to the specifics of training for each component.

Comparison Training. Children were taught to listen to each pair of sentences that they heard, and then to compare the sentences to determine if they made sense together. Initially the experimenter provided the following description and rationale:

> "Now we are going to do five practice stories together so that I can show you a good way to listen to a story to see if it makes sense. After we do the five practice stories there will be four stories for you to do by yourself. O.K., this is how we are going to listen to the stories to see if they make sense. First, we will LISTEN carefully to each part of the

story. Then during the pause we will COMPARE the sentences to see if they make sense together. To compare the sentences we will answer the question "Do these sentences make sense together?"

The strategy description was repeated and then the child was asked to explain the strategy that was to be used. The experimenter then presented an 8" x 10" yellow acetate sheet with the question, "Do these sentences make sense together?" printed in black ink. The acetate was placed over a white piece of paper on the desk in front of the child. The child was told that the acetate would serve as a reminder to compare the sentences to see if they made sense together.

Next, the experimenter modeled the implementation of the comparison strategy on the first training passage, the inconsistent version of the 'Sea horses' story. Following presentation of each consistent sentence pair, the experimenter said, "Compare. Yes, these sentences make sense together." When the explicitly inconsistent sentences were presented (i.e., sentences 6a and 6b), the experimenter indicated that the sentences did not make sense together and provided an explanation for this evaluation. For example, after the inconsistent sentences were presented in the 'Sea horses' passages, the experimenter said, "Compare. No, he said the sea horse moves slowly and then he said it swims away quickly from enemy fish." At the end of the passage the experimenter provided a summary evaluation of the passage as discussed earlier. For the 'Sea horses' - inconsistent passage the sequence of summary evaluation statements included, 1) that the story did not make sense; 2) the part that did not make sense stated that the sea horse swims slowly through the water and then it said the sea horse swims away quickly from enemy fish; and 3) that the listener is left not knowing how the sea horse escapes enemy fish.

During the presentation of the second training passage, 'Giraffes' - inconsistent, the experimenter continued to model the implementation of the comparison strategy and generation of the summary evaluation statements, but encouraged the child to participate as well. For the remaining three passages the experimenter encouraged increasingly greater independence in the child's employment of the comparison strategy. The verbal dialogue was faded across the five passages. Upon completion of training, the strategy prompt (yellow acetate sheet) was removed and the child was asked about her/his understanding of the comparison strategy.

Comparison + Monitoring Training. Children assigned to the Comparison + Monitoring training condition received identical training to the children in the Comparison training group on the first two training passages. After the second passage the child was questioned to determine if s/he fully understood the comparison strategy, then was told:

> "O.K. now we will listen to those stories again and this time we will COMPARE the sentences to see if they make sense together and we will CHECK BACK to see if this part of the story makes sense with the other parts of the story we heard. We will check back to see if the whole story makes sense by answering the question "Does the whole story make sense?" after we hear each part of the story."

The comparison and monitoring strategies were reviewed a second time, and then the child was asked to explain the strategies that would be employed in the training passages. The experimenter next produced another 8" x 10" yellow acetate sheet and the question "Does the story make sense?" printed in black ink. This acetate was placed over the acetate with the sentence "Do these sentences make sense together?" so that both questions could be seen by the child.

Next the experimenter modeled the comparison and monitoring strategies on the first training passage (i.e., "Sea horses' - inconsistent). After each consistent sentence pair (i.e., sentences la through 5b) the experimenter stated, "Compare. Yes, these sentences make sense together. Check back yes, the whole story makes sense so far." When the inconsistent sentences were presented (i.e., sentences 6a and 6b) the experimenter indicated that the sentences were incompatible and also indicated which 'previously heard' sentences were inconsistent with the 'just heard' sentences. Thus, for the 'Ses horses - inconsistent' passage the experimenter stated:

> "Compare. No, he said the sea horse moves slowly, then he said it swims away from enemy fish. Check back. No, he said before that the sea horse is <u>not</u> a fast swimmer, it makes jerky movements as it swims."

After the final two sentences (i.e., 7a and 7b) the experimenter stated, "Compare. Yes, these sentences make sense. Check back. No, the story does not make sense because we still don't know how the sea horse escapes enemy fish."

After the story was finished the experimenter provided a summary evaluation of the passage. The basic difference between the summaries generated in the Comparison and Comparison + Monitoring Training groups was that in the latter the recapitulation of the inconsistent sentences included the inconsistent sentences that were contiguous (i.e., 6a and 6b), as well as the adjacent sentences that were inconsistent (i.e., 5a and 5b). For example, for the 'Sea horses' - inconsistent passage the experimenter stated; 1) that the story did not make sense; 2) that the one part that did not make sense said the sea horse swims slowly through the water, and then it said the sea horse swims away quickly from enemy fish; 3) before that part he said that the sea horse is not a fast swimmer, it makes jerky movements as it swims. Therefore, it does not make sense that the sea horse would escape enemy fish by quickly swimming away; and 4) that the listener is left not knowing how the sea horse escapes enemy fish.

The experimenter assisted the child in application of both comparison and monitoring strategies to the second training passage, and in generating the summary evaluation for that passage. The sequence of increased independence of the child's performance and fading of overt vocalizations across the three remaining training passages, as well as the final comprehension check, was followed for the children assigned to this condition.

Comparison + Monitoring + Self-Instruction Training. In addition to instruction in the comparison and check back strategies, children in this condition were taught to use self-statements to guide and oversee the implementation of the cognitive and metacognitive strategies they were trained to employ. The appropriate self-statements (adapted from Camp et al., 1977) were presented in a question and answer format, and were designed to meet Meichenbaum's (1975) criteria for appropriate self-statements. The self-questions that were employed, and the nature of the answer in terms of Meichenbaum's criteria for an appropriate self-statements, included: 1) "What am I supposed to do?" was used to elicit relevant self-statements regarding the nature of the task; 2) "What is my plan?" was employed to ensure that the child verbalized a plan for monitoring his/her listening comprehension that encompassed both the cognitive and metacognitive strategies; 3) "Am I using my plan?" was employed to evaluate the correct implementation of the strategies; and 4) "How did I do?" was used to evaluate performance and reward correct performance.

Children in this group received training identical to the children assigned to the Comparison + Monitoring Training group to the end of the second training passage. Following this the children were told that they would listen to the first two training passages again (i.e., 'Sea horses' - inconsistent and 'Giraffes' - inconsistent), but this time they would use four questions to help them do a good job of listening to stories to see if they make sense. The experimenter then presented the child an 8" x 10" yellow acetate and the questions "What am I supposed to do?", "What is my plan?", "Am I using my plan?" and "How did I do?" printed in black ink. This sheet was placed over the two sheets that were already in front of the child such that the questions "Do these sentences make sense together?" and "Does the whole story make sense?" appeared between the questions "What is my plan?" and "Am I using my plan?" Thus, the questions appeared before the child in the order in which they were to be employed.

An explanation and rationale for using the four questions followed:

"To help us do a good job of listening to the stories to see if they make sense we are going to ask ourselves the following questions. Before we start, we are going to ask "What am I supposed to do?" Well, we know we are supposed to listen to the story to see if it makes sense. Then we will ask "What is my plan?" Well we have a very good plan. First we listen carefully to each part of the story. Then we compare the two sentences to see if they make sense together. We compare the sentences by answering the question "Do these sentences make sense together?" Then we check back to see if the whole story makes sense by answering the question "Does the whole story make sense?" Then we will be ready to listen to the story. When we are about half way through the story we will ask ourselves "Am I using my plan?" to make sure we are remembering to compare and check back. When we finish we will ask "How did I do?" so we can give ourselves a pat on the back for our good work."

Following repetition of the rationale, the child was queried to assess her/his understanding of the combined comparison and monitoring and self-instruction approach. Again, the experimenter modeled the use of all three strategies on the first training passage ('Sea horses' - inconsistent). The evaluation summary stated at the end of the passage was identical to that described for the Comparison + Monitoring

Training group. Increasingly active involvement by the child was required across the remaining training passages. By the final training passage each child was employing the strategies independently and no longer verbalized the strategies. Upon completion of the training passages, the child was questioned to ensure s/he understood the components of the trained strategies (again the question cues were removed prior to questioning).

Comprehension Monitoring Outcome Knowledge Control. Children in this condition were initially provided the appropriate standard of evaluation, and were then told:

> "Now we are going to do five practice stories together so that I can show you a good way to listen to a story to see if it makes sense. After we do the five practice stories together, there are four stories for you to do by yourself. O.K. this is how we are going to listen to the stories to see if they make sense. First we will LISTEN carefully to each part of the story. Then during the pause we will THINK hard about whether the story makes sense."

The strategy explanation was repeated, and the child was queried to assess her/his understanding of the strategy. The experimenter then modeled the use of the strategy on the first training passage. After presentation of each sentence pair, the experimenter said "think". Upon termination of the first training passage, the experimenter stated the summary evaluation that was generated by the training groups instructed to employ the comparison and monitoring strategies. The child was encouraged to imitate the experimenter in terms of listening and thinking strategies. The child initially said "think" out loud after each sentence pair, but this was gradually faded over the five training passages. However, following each of the training passages the experimenter provided the summary evaluation of the passage, and the child was not encouraged to generate this information.

Thus, this group represents a passive training group in that the children were provided with a very general strategy and then provided with the comprehension monitoring outcome knowledge. This group controlled for the comprehension monitoring outcome knowledge generated by the group hypothesized to be receiving optimal training (i.e., Comparison + Monitoring + Self-Instruction training group). As with the other training groups, at the end of the five training passages the child was asked about the strategy s/he had been instructed to employ.

Obviously, depending on the child's experimental group assignment s/he spent differential amounts of time in the various training or control group manipulations. Instructional time ranged from approximately five minutes in the Posttest Only control group to forty minutes in the Comparison + Monitoring + Self-Instruction training condition. This time difference is a common, unavoidable problem in instructional research (Pressley & Mullally, 1983). However, I would like to call attention to two safeguards that were built into the experimental design to counteract the differential instructional time problem: 1) in the three active training conditions (i.e., Comparison, Comparison + Monitoring, and Comparison + Monitoring + Self-Instruction training groups) there was only a range of approximately ten minutes difference in instructional time, and all training took place on the first two training passages so that elaborated training was not equated with additional exposure to training passages; and 2) exposure to the critical materials (i.e., test passages) at immediate and delayed testing was equivalent for all the children (following the suggestions made by Fau and Waller, 1976 and Pressley and Mullally, 1983).

Immediate Maintenance Testing. Immediately following the control group or training manipulations, another tape recorder was placed on the table and the child was told:

> "O.K. now I have four stories for you to listen to by yourself. I want you to listen carefully to the stories to see if they make sense. After each story I will ask you some questions. I will record your answers on this tape recorder. Do you have any questions."

The child's judgments of each of the immediate maintenance passages was recorded as well as her/his answers to the experimental interview.

Session Two

Delayed Maintenance Testing. Six to eight days after the initial session, delayed maintenance was assessed. During this second session no mention was made of the child's previous training or control group manipulation. Each child was provided with the same introduction to the experiment as in session one. Then each child assessed the comprehensibility of four new passages and the experimental interview was completed.

Dependent Measures and Scoring Criteria

Listening Comprehension Monitoring Measures

During immediate and delayed maintenance testing each child was presented three inconsistent passages and one consistent passage. There were four sentences that were relevant to the inconsistency (i.e., sentences 5a through 6b) in each of the inconsistent passages. For example, in the 'Elephant' - inconsistent passage the four sentences were: 5a. "A cow elephant is always the leader of the herd."; 5b. "The cow elephant is a very careful leader."; 6a. "The cow elephant leads the herd safely to a new feeding place."; and 6b. "When elephants travel they all follow the bull elephant." Thus, sentences 5a, 5b and 6a are consistent with each other, while sentence 6b is inconsistent with the information presented in the previous three sentences.

Immediately following the four passages that were presented at immediate and delayed testing, the subjects were asked, "Did this story make sense?" Based on their responses to this question across the four passages, four listening comprehension monitoring measures were derived.

Inconsistencies Detected. Children were credited with detecting an inconsistency in an inconsistent passage if they stated that the passage did not make sense, and provided a justification that included information from sentence 6b and at least one piece of information from sentences 5a, 5b, and 6a. For some children their answers to "Did this story make sense?" were unclear for the inconsistent passages. Therefore, two probe questions, "What part did not make sense?" and "Why didn't it make sense?" were used to clarify the children's answers when necessary. Answers to the probes were used in determining if the child would be credited with detecting the inconsistency in the inconsistent passages. The total possible detections score was three.

Comprehension Monitoring Quality Scores for Inconsistencies Detected. While the measure discussed above provides a quantitative index of the number of inconsistencies detected, it does not indicate the quality of the child's answer in terms of the number of 'bits' of information the child used to justify the incomprehensibility of the inconsistent passage. In order to be credited with detecting the inconsistency the child has to cite two pieces of information (i.e., information from sentence 6b plus one piece of information from sentences 5a, 5b or 6a). In some of the experimental groups, however, the children were trained to provide all four relevant pieces of information (i.e., Comparison + Monitoring and Comparison + Monitoring + Self-Instruction training groups). Therefore, each child was assigned a comprehension monitoring quality score (ranging from 2 to 4), based on the number of 'bits' of information s/he provided in her/his justification for each inconsistent passage s/he identified as inconsistent. Thus, for each child there was a possible total quality score of 12 across the three inconsistent passages. The mean quality of the children's justifications for the inconsistent passages could then be compared across the experimental groups.

Total Listening Comprehension Monitoring Score. Each child was assigned a score out of 4 based on the number of inconsistent passages s/he correctly judged, and whether s/he correctly assessed the consistent passage. This measure provides a broader index of the children's performances on the test passages.

Perfect Monitoring. Perfect monitoring was defined as correctly identifying the inconsistent passages and providing an adequate justification, and stating that the consistent passage made sense. This measure provided a stringent index of the children's ability within each experimental group to discriminate between inconsistent and consistent passages.

Memory Measure

Children's recall of the final passages presented during immediate and delayed maintenance was scored according to the number of idea units stated. Each passage (i.e., 'Elephants' - inconsistent and 'Gorillas' - inconsistent) was divided into 17 idea units. An idea unit was defined as a specific piece of information about the passage-topic animal. For example, the sentence in the 'Gorilla' passage "Gorillas are big, hairy animals that live in the jungle" included three idea units: 1) gorillas are big; 2) gorillas are hairy; and 3) gorillas live in the jungle.

A child was given credit for an idea unit if her/his recall contained the gist of the information. For example, if a child's recall of the 'Gorillas' passage contained the statement "Gorillas are huge furry animals", s/he received credit for two of the three idea units contained in that sentence. Appendix E lists the idea units for both the 'Elephants' and 'Gorillas' passages.

Measures of Strategy Use

As indicated previously in the section on the experimental interview, children were asked to explain the strategy they used while listening to the final passage to determine if it made sense. Each child's response to this question was used to make a global assessment of the strategy s/he used to monitor her/his comprehension. In addition, the children were presented a typed copy of the final passage (i.e., either 'Elephants' - inconsistent or 'Gorillas' - inconsistent), and again asked to demonstrate the strategy with specific reference to the passage.

The children's response to both the explanation and description strategy use questions were scored according to an eight-point scale (see Appendix E for a more complete description and examples): 0 - no strategy; 1 - listening; 2 - miscellaneous strategy (e.g., thinking, using imagery, comments, questions); 3 - non-specific evaluation strategy (i.e., evaluating whether the sentences made sense); 4 - comparison strategy (i.e., comparing sentences pairs to determine if they made sense together); 5 - checking back strategy (i.e., checking back to see if 'previously heard' information makes sense with 'just heard' information); 6 - comparison and checking back strategies; and 7 - comparison and checking back strategies plus self-instruction statements (i.e., "What am I supposed to do?" "What is my plan?" "Am I using my plan?" "How did I do?").

Strategy Explanation Measure

Each child's explanation of the strategy s/he used to determine if the final passage made sense was assigned a score based on the most sophisticated strategy the child discussed. For example, if the child said s/he listened and compared the sentences to see if they made sense, s/he was assigned a score of 4.

Strategy Demonstration Measure

Each child's strategy demonstration score was derived from her/his discussion of what s/he did after each two-sentence pair of the final passage was presented. The child's response concerning the strategy s/he used to monitor her/his comprehension after the first, second, third, fourth and fifth sentence pairs of the final passage were scored according to the eight-point scale. A global strategy demonstration score was assigned based on the strategy indicated by the child in three or more of the sentence pairs. If the child's demonstrations of the strategy s/he used were not consistent enough to permit this derivation, the median of the strategy demonstration scores for the first five sentence pairs was used. It should be noted that while each child's strategy demonstrations on each of the five sentence pairs was scored on the 8 point scale (i.e., 0 to 7), the highest strategy demonstration score a child could receive was 6. Recall that the children were instructed to use two self-instructions prior to commencing the task, and one at the conclusion of the passage. Only one self-instruction was used during the actual processing of the passage (i.e., "Am I using my plan?"). The children who employed the self-instruction strategy only mentioned this one self-instruction when queried across the five sentence pairs (thus, were only credited one 7 point response). The maximum scoring configuration a child could achieve on this strategy measure was four 6 point responses and one 7 point responses, resulting in a maximum score of 6.

Handling of the Inconsistency Measure

The sixth sentence pairs presented when the strategy description data were collected contained the explicit inconsistency (i.e., sentences 6a and 6b). This allowed for a determination of how the child handled the inconsistency. The child's answers were scored according to a six-point scale based on how much information the child used to justify her/his assessment of the sentence pairs: 0 - inconsistency undetected; 1 - sentence 6b is inconsistent with sentence 6a; 2 - sentence 6b is inconsistent with the information in sentences 5a <u>or</u> 5b; 3 - sentence 6b is inconsistent with sentences 6a, and sentence 5a <u>or</u> 5b; 4 - sentence 6b is inconsistent with sentences 5a and 5b; and

5 - sentence 6b is inconsistent with sentence 6a and sentences 5a and 5b.

Concept of Sense Measure

Each child's definitions of when a story does not make sense, and examples of things that do not make sense were scored on a two-point scale (i.e., 0 or 1). One point was credited when the child's definition or example contained the concept of contradiction or opposite. For example, a one-point resonse to the definition query would be "I know a story does not make sense when two sentences say opposite things." A one-point response to the example query would be "Cats are good pets, cats are bad pets." All other responses to the definition and example questions were scored 0. Answers scored 0 often included a fantasy concept, for example, "Fairytales do not make sense." A total concept of sense score (i.e., out of 2) was derived for each child by adding her/his explanation and example scores.

Discriminative Monitoring Measures

For the reading comprehension task the child was credited with 1 point if s/he responded to the monitoring question (i.e., "What would you do if I asked you to read this story to find any sentences that do not belong in the story?") that the strategy s/he would employ would be to read each sentence and compare it to previously heard sentences. In addition, the child was credited 1 point if s/he indicated that her/his criterion for judging when a sentence did not belong in the story was that the information conflicted with, or was unrelated to the rest of the story.

For the non-monitoring question on the reading comprehension task (i.e., "What would you do if I asked you to read this story to find any spelling mistakes in the story?") that child was credited with 1 point if s/he indicated that the strategy s/he would employ would be to look carefully at each word to determine if it was spelled correctly. Also, the child was credited 1 point if s/he indicated an appropriate criterion for judging the correctness of the spelling of a word (i.e., look it up in the dictionary, draw on past knowledge of words, attempt to pronounce it, etc.). All other responses to these queries were scored 0.

On the referential communication task the child was credited 1 if s/he responded to the monitoring question (i.e., "What would you do if I asked you to point to the striped triangle?") that s/he could not point to the striped triangle because more information was needed (e.g., size of triangle, colour of stripes). For the non-monitoring question on this task (i.e., "What would you do if I asked you to remember the designs on this card?") the child was credited with 1 point if s/he stated that s/he would employ an appropriate mnemonic to assist in remembering the design (e.g., draw it on a piece of paper, say the design out loud repeatedly, etc.). All other responses were scored 0.

See Appendix E for an elaboration of the scoring criteria for the discriminative monitoring measures.

RESULTS

The results section is divided into five sections: comprehension monitoring measures, concept of sense measures, strategy use measures, recall measures, and discriminative monitoring measures. There is a detailed review of the findings for each of these measures. More global interpretations of the results are left to the discussion.

Table 13 presents the interrater reliability data for each measure. Interrater reliability was calculated for each measure by the percentage of exact agreement between the experimenter and a second rater, both raters were blind to the subjects' experimental condition at the time of scoring. For each measure, the experimenter first explained the scoring criteria (as outlined previously in the Method section), and then illustrated the use of the scoring criteria on sixteen randomly selected protocols (i.e., one from each condition at each time of testing). Following this instruction, the second rater was required to score the measures independently across 64 protocols (i.e., four ~~randomly selected~~ from each condition at each testing time). There was a high degree of interrater agreement, ranging from 80% to 98%, with a mean reliability of 90% across all measures.

The present study was designed to determine the effects of providing an appropriate standard of evaluation on efficient listening comprehension monitoring relative to: 1) control group manipulations which did not involve provision of a standard (i.e., posttesting only, and simple exposure to training materials); 2) provision of an appropriate standard plus exposure to training materials; 3) provision of an appropriate standard of evaluation and exposure to comprehension monitoring outcome knowledge; and 4) provision of an appropriate

Table 13

Percentage of Interrater Agreement Across Measures

Measure	Percent Agreement
Comprehension Monitoring Measures	
Inconsistencies detected	97
Quality of inconsistency judgments	86
Total listening comprehension monitoring scores	97
Proportion of perfect monitors	97
Concept of Sense Measures	
Standard of evaluation	92
Example	89
Strategy Use Measures	
Explanation of strategy	84
Demonstration of strategy	97
Handling of the inconsistency	98
Recall Measures	
Total idea units recalled	90
Idea units relevant to the inconsistency recalled	81
Discriminative Monitoring Measures	
Reading Comprehension - Monitoring	
strategy	89
criterion	89
Reading Comprehension - Nonmonitoring	
strategy	83
criterion	94
Referential Communication - Monitoring	92
Referential Communication - Nonmonitoring	80

standard of evaluation and training in strategies (i.e., comparison, monitoring and self-instruction) hypothesized to be critical in efficient listening comprehension monitoring.

Thus, seven planned comparisons were specified a priori, and seven Dunn's comparisons (Kirk, 1968) or seven planned proportional comparisons (Marascuilo & McSweeney, 1977) were the basis of data analysis for each measure. The error rate was preset at $\alpha = .343$ for each set of comparisons, and $\alpha = .049$ per comparison. This error rate is comparable to that of many designs with eight conditions and $\alpha = .05$ per effect (e.g., $\alpha = .35$ in 2 x 2 x 2 ANOVA design with $\alpha = .05$ per effect). Also, this setup permitted good power for detecting 1 standard deviation effects in the parametric analyses, and proportional differences greater than 40% (i.e., $\beta = .80$ in both cases).

Comprehension Monitoring Measures

The traditional listening comprehension monitoring measure reported in the literature is the mean number of inconsistencies detected (e.g., Markman & Gorin, 1981). In this study, each child was asked to judge the comprehensibility of three inconsistent passages both immediately after training or control group manipulations, and six to eight days later. The means and standard deviations for inconsistencies detected at both testing times are presented in Table 14.

Inconsistencies detected across the experimental conditions were compared relative to the Appropriate Standard of Evaluation condition, for both immediate performance and on delayed testing. The results of these analyses are displayed in Table 15. In support of Markman and Gorin's (1981) findings, children in the Appropriate Standard of

Table 15

Dunn's Comparisons of the Number of Inconsistencies Detected Relative to the Appropriate Standard of Evaluation Condition

Comparisons	t - values	
	Immediate Testing[a]	Delayed Testing[b]
Standard vs. Posttest Only	4.812*	3.801*
Standard vs. Story Exposure	5.112*	4.223*
Standard vs. Standard + Story Exposure	1.202	2.814*
Standard vs. Comprehension Monitoring Outcome Knowledge	.300	.139
Standard vs. Comparison Training	-.451	.139
Standard vs. Comparison + Monitoring Training	-1.805	.280
Standard vs. Comparison + Monitoring + Self-Instruction Training	-1.805	-1.551

* critical t-value = 1.983 at $p < .049$.

[a]MSE = .919. [b]MSE = 1.052.

Table 15

Dunn's Comparisons of the Number of Inconsistencies Detected Relative to the Appropriate Standard of Evaluation Condition

Comparisons	t - values	
	Immediate Testing[a]	Delayed Testing[b]
Standard vs. Posttest Only	4.812*	3.801*
Standard vs. Story Exposure	5.112*	4.223*
Standard vs. Standard + Story Exposure	1.202	2.814*
Standard vs. Comprehension Monitoring Outcome Knowledge	.300	.139
Standard vs. Comparison Training	-.451	.139
Standard vs. Comparison + Monitoring Training	-1.805	.280
Standard vs. Comparison + Monitoring + Self-Instruction Training	-1.805	-1.551

* critical t-value = 1.983 at $p < .049$.

[a]MSE = .919. [b]MSE = 1.052.

Evaluation control groups were significantly better at detecting inconsistencies, at both immediate and delayed testing, than children in control conditions who were not provided with an appropriate standard for judging the comprehensibility of the passages (i.e., Posttest Only and Story Exposure groups). Also, at delayed testing only, the children in the Appropriate Standard of Evaluation condition detected significantly more inconsistencies than the children in the Appropriate Standard + Story Exposure condition.

There were no significant differences between the mean number of inconsistencies detected by the children in the Appropriate Standard of Evaluation group, and the children assigned to any of the training conditions at both testing times. However, there was a definite trend in the data indicating that at immediate testing the children assigned to the Comparison + Monitoring and Comparison + Monitoring + Self-Instruction training conditions detected more inconsistencies than the children in the Appropriate Standard of Evaluation condition, and this trend was maintained at delayed testing by the children in the Comparison + Monitoring + Self-Instruction training group. It is possible that performance in these two conditions may have been constrained by the ceiling of three inconsistencies (i.e., $\bar{x}$ = 2.708 and s.d. = .550 for both groups at immediate testing, and $\bar{x}$ = 2.792 and s.d. = .415 for the Comparison + Monitoring + Self-Instruction training group at delayed testing).

While the number of inconsistencies detected across conditions provides a gross index of the children's ability to judge the comprehensibility of inconsistent passages, an examination of the quality of these judgments allows for a finer analysis of the children's performances. For each inconsistent passage the inconsistency revolved around three consistent sentences and one inconsistent sentence (i.e., inconsistent because it contradicted the information presented in the previous three sentences). Therefore, for each inconsistent passage the child could cite a total of four pieces of information to justify his/her judgment of the incomprehensibility of the passage. The total possible score in this quality of judgment measure was twelve (i.e., four pieces of information on each of three passages). Table 16 presents the means and standard deviations for the quality of comprehensibility judgments on the inconsistent passages as a function of experimental condition and time of testing.

Table 17 presents the results of the Dunn's comparisons of the quality of comprehensibility judgments. Obviously, there was a dependent relationship between the detection of inconsistencies and quality of comprehensibility judgments measures (i.e., assignment of a quality score depends on detection of the inconsistency). Thus, the superior quality of the Appropriate Standard of Evaluation explanations relative to the Posttest Only and Story Exposure conditions at both testing times, and the Appropriate Standard + Story Exposure condition at delayed testing, was expected based on the analysis of inconsistency scores presented earlier.

While there were no significant differences between the number of inconsistencies detected by children in the Appropriate Standard of Evaluation condition and any of the training conditions, there were differences when the quality of the comprehensibility judgments was considered. From Table 17, the quality of judgments made by children in both the Comparison + Monitoring and Comparison + Monitoring + Self-

Table 16

Quality of Comprehensibility Judgments on Inconsistent Passages as a Function of Experimental Condition and Time of Testing

Experimental Condition	Immediate Testing		Delayed Testing	
	$\bar{x}$	SD	$\bar{x}$	SD
Posttest Only	1.750	1.890	2.458	2.500
Story Exposure	1.792	2.770	2.292	2.710
Appropriate Standard	4.625	2.280	4.875	2.380
Appropriate Standard + Story Exposure	4.083	2.920	3.042	2.530
Comprehension Monitoring Outcome Knowledge	4.542	2.590	4.917	1.910
Comparison Training	4.958	1.600	4.833	2.080
Comparison + Monitoring Training	6.042	1.550	4.792	2.150
Comparison + Monitoring + Self-Instruction Training	6.417	1.840	6.333	1.270

n = 24 per condition.

Maximum score = 12.

Table 17

Dunn's Comparisons of the Quality of Comprehensibility Judgments Relative to the Appropriate Standard of Evaluation Condition

Comparisons	t - values	
	Immediate Testing[a]	Delayed Testing[b]
Standard vs. Posttest Only	4.450*	3.753*
Standard vs. Story Exposure	4.385*	4.011*
Standard vs. Standard + Story Exposure	.839	2.846*
Standard vs. Comprehension Monitoring Outcome Knowledge	.128	.065
Standard vs. Comparison Training	-.515	.065
Standard vs. Comparison + Monitoring Training	-2.193*	.129
Standard vs. Comparison + Monitoring + Self-Instruction Training	-2.774*	-2.264*

* critical *t*-value = 1.983 at $p < .049$.

[a]MSE = 5.003. [b]MSE = 4.984.

Instruction training conditions was significantly superior to those made by children in the Appropriate Standard of Evaluation condition at immediate testing. The children in the Comparison + Monitoring + Self-Instruction training condition maintained this superior performance at delayed testing.

To this point only the detection of inconsistencies data has been reported, however, this provides only a partial picture of the children's overall listening comprehension monitoring performances. A total listening comprehension monitoring score was derived for each child by assigning one point for each of the three inconsistent passages correctly identified and justified, and one point for correctly identifying the consistent passage. Thus, each child's total listening comprehension monitoring score is based on a possible total of four. The means and standard deviations for the children's total listening comprehension monitoring scores on the four test passages at both testing times are presented in Table 18.

The results of the planned comparisons for the total listening comprehension score data are presented in Table 19. At immediate testing the children in the Appropriate Standard of Evaluation condition attained significantly higher total listening comprehension monitoring scores relative to the children in both the Posttest Only and Story Exposure conditions. Also, at this testing time, the children in the Comparison + Monitoring and Comparison + Monitoring + Self-Instruction training conditions scored significantly higher on the total listening comprehension monitoring measure compared to the children in the Appropriate Standard of Evaluation condition. At delayed testing, the children in the Appropriate Standard of Evaluation condition scored

Table 18

Total Listening Comprehension Monitoring Scores as a Function of Experimental Condition and Time of Testing

Experimental Condition	Immediate Testing		Delayed Testing	
	$\bar{x}$	SD	$\bar{x}$	SD
Posttest Only	1.333	1.170	1.792	1.320
Story Exposure	1.500	1.180	1.917	1.410
Appropriate Standard	2.917	1.020	3.125	1.080
Appropriate Standard + Story Exposure	2.625	1.440	2.417	1.380
Comprehension Monitoring Outcome Knowledge	2.958	1.330	3.167	.868
Comparison Training	3.042	.859	3.167	.917
Comparison + Monitoring Training	3.625	.576	3.125	.900
Comparison + Monitoring + Self-Instruction Training	3.625	.576	3.792	.415

n = 24 per condition.

Maximum score = 4.

Table 19

Dunn's Comparisons of Total Comprehension Monitoring Scores Relative to the Appropriate Standard of Evaluation Condition

Comparisons	t - values: Immediate Testing[a]	Delayed Testing[b]
Standard vs. Posttest Only	5.160*	4.259*
Standard vs. Story Exposure	4.616*	3.859*
Standard vs. Standard + Story Exposure	.951	2.262*
Standard vs. Comprehension Monitoring Outcome Knowledge	-.134	-.134
Standard vs. Comparison Training	-.407	-.134
Standard vs. Comparison + Monitoring Training	-2.306*	.000
Standard vs. Comparison + Monitoring + Self-Instruction Training	-2.306*	-2.130*

* critical t-value = 1.983 at $p < .049$.

[a]MSE = 1.131. [b]MSE = 1.172.

significantly higher than the children in the Posttest Only, Story Exposure and Appropriate Standard of Evaluation + Story Exposure conditions. However, at this testing time only the children in the Comparison + Monitoring + Self-Instruction training group achieved significantly higher total scores relative to the Appropriate Standard of Evaluation condition.

While the total listening comprehension monitoring scores include the children's performances on both the consistent and inconsistent passages, they do not provide an index of the children's ability to discriminate inconsistent and consistent passages with perfect accuracy. This most stringent index of the children's listening comprehension monitoring performances was provided by determining the proportion of perfect monitors across experimental conditions. Perfect monitors were defined as children who detected the three inconsistencies and stated that the consistent passage was comprehensible. The proportion of perfect monitors in each condition is presented in Table 20.

Planned comparisons of the proportion of perfect monitors (Marascuilo & McSweeney, 1977) both immediately following training and on delayed testing are presented in Table 21. Following the convention of Marascuilo and McSweeney (1977) the Z statistic is reported for these planned proportional analyses. The Z statistic is distributed as $\sqrt{\chi^2}$ with one degree of freedom, which is equivalent to the $\underline{t}$ distribution as the degrees of freedom approaches infinity.

A significantly greater proportion of children in the Appropriate Standard of Evaluation condition than in the Posttest Only group demonstrated perfect monitoring performances immediately after training and at delayed testing. There were no significant differences between

Table 20

Proportions of Perfect Monitors as a Function of Experimental Condition and Time of Testing

Experimental Condition	Immediate Testing	Delayed Testing
Posttest Only	.042	.125
Story Exposure	.083	.250
Appropriate Standard	.333	.500
Appropriate Standard + Story Exposure	.458	.250
Comprehension Monitoring Outcome Knowledge	.500	.458
Comparison Training	.333	.458
Comparison + Monitoring Training	.667	.417
Comparison + Monitoring + Self-Instruction Training	.667	.792

n = 24 per condition.

Table 21

Planned Comparisons of the Proportion of Perfect Monitors Relative to the Appropriate Standard of Evaluation Condition

Comparisons	z - values: Immediate Testing[a]	z - values: Delayed Testing[b]
Standard vs. Posttest Only	2.064*	2.641*
Standard vs. Story Exposure	1.773	1.761
Standard vs. Standard + Story Exposure	-.887	1.761
Standard vs. Comprehension Monitoring Outcome Knowledge	-1.184	.296
Standard vs. Comparison Training	.000	.296
Standard vs. Comparison + Monitoring Training	-2.369*	.585
Standard vs. Comparison + Monitoring + Self-Instruction Training	-2.369*	-2.056*

* critical z-value = 1.983 at p < .049.

[a] SE = .141. [b] SE = 142.

the proportion of perfect monitors in the Appropriate Standard of Evaluation condition and the other control groups at either testing time. However, there was a trend in the data indicating that fewer children in the Story Exposure group demonstrated perfect monitoring than children in the Appropriate Standard of Evaluation condition at both testing times. Also, there was a trend for fewer children in the Appropriate Standard + Story Exposure group to exhibit perfect monitoring performances relative to the Appropriate Standard condition at delayed testing.

The proportions of subjects exhibiting perfect monitoring immediately after training was significantly greater in the Comparison + Monitoring and the Comparison + Monitoring + Self-Instruction training conditions than in the Appropriate Standard of Evaluation control condition. However, only the children in the Comparison + Monitoring + Self-Instruction Training condition exhibited significantly superior performance at delayed testing.

Concept of Sense Measure

The children's conceptions of sense were assessed by asking them to explain or define the criteria they used to assess the comprehensibility of the stories, and to provide an example of something that does not make sense. The children's responses to both these queries were scored on a two-point scale (i.e., 0 or 1). Each child was credited one point if his/her definition or example of sense contained the concept of a contradiction between two or more sentences. Thus, a concept of sense score, out of a possible total of two, was derived for each child. Table 22 presents the means and standard deviations for the total

Table 22

Total Concept of Sense Scores as a Function of Experimental Condition and Time of Testing

Experimental Condition	Immediate Testing		Delayed Testing	
	$\bar{x}$	SD	$\bar{x}$	SD
Posttest Only	.458	.833	.543	.833
Story Exposure	.458	.779	.500	.780
Appropriate Standard	1.458	.721	1.458	.779
Appropriate Standard + Story Exposure	1.042	.859	1.417	.830
Comprehension Monitoring Outcome Knowledge	1.250	.794	1.417	.776
Comparison Training	1.333	.868	1.417	.776
Comparison + Monitoring Training	1.333	.761	1.375	.647
Comparison + Monitoring + Self-Instruction Training	1.458	.658	1.625	.495

n = 24 per condition.

Maximum score = 2.

concept of sense scores as a function of experimental condition and time of testing.

The results of the Dunn's comparisons on the total concept of sense measure are presented in Table 23 . Children in the Appropriate Standard of Evaluation condition scored significantly higher on this measure than children in the Posttest Only and Story Exposure control conditions at both immediate and delayed testing. However, there were no significant differences between the scores of the children in the Appropriate Standard of Evaluation condition and any of the training conditions at either time of testing.

Thus, all groups that were provided with a standard of evaluation (i.e., Appropriate Standard of Evaluation, Appropriate Standard of Evaluation + Story Exposure, and the four training groups) used equivalent criteria to judge the comprehensibility of the passages.

Measures of Strategy Use

Following the presentation of the final inconsistent passage during each testing session, the children were asked to explain to the experimenter how they had listened to the story to determine if it made sense. The children's strategy explanations were scored on an eight-point scale according to the number of components hypothesized to be critical to efficient listening comprehension monitoring, that were included in their responses. Thus, a score of 0 was given if the child indicated that s/he did not use a strategy, and a score of 7 was given if the child's explanation included references to the comparison, monitoring and self-instruction strategies.

Table 23

Dunn's Comparisons of the Total Concept of Sense Scores Relative to the Appropriate Standard of Evaluation Condition

	t - values	
Comparisons	Immediate Testing[a]	Delayed Testing[b]
Standard vs. Posttest Only	4.405*	4.241*
Standard vs. Story Exposure	4.405*	4.435*
Standard vs. Standard + Story Exposure	1.833	.190
Standard vs. Comprehension Monitoring Outcome Knowledge	.916	.190
Standard vs. Comparison Training	.551	.190
Standard vs. Comparison + Monitoring Training	.551	.384
Standard vs. Comparison + Monitoring + Self-Instruction Training	.000	-.773

* critical t-value = 1.983 at $p < .049$.

[a]MSE = .619. [b]MSE = .558.

Calculations of the within cell correlations of the strategy use and listening comprehension measures would have been meaningless due to the restricted range of variability for many measures in a number of cells. Appendix F contains tables of the number of children in each experimental condition achieving various strategy explanation and demonstration scores as a function of their total listening comprehension monitoring scores. From these tables it is obvious that across the experimental groups (i.e., from Posttest Only through Comparison + Monitoring + Self-Instruction Training group) there is an increase in total listening comprehension monitoring scores concommitant with an increase in the sophistication of the strategy explanation and demonstration scores. In the text of the present thesis, the data on the children's strategy use measures will be reported in terms of group means and standard deviations. The children's mean strategy explanation scores across conditions are presented in Table 24.

Children in the four control conditions typically did not include in their explanations of the strategies they employed, any references to the strategies hypothesized to be sufficient for efficient listening comprehension monitoring. Typically, the children in the Posttest Only and Story Exposure conditions reported that they employed miscellaneous strategies such as imagining the information in picture form, repeating the information, thinking about the story etc. Children in the Appropriate Standard and the Appropriate Standard + Story Exposure conditions typically reported using a miscellaneous strategy or a non-specific evaluation strategy (i.e., they stated that they thought about the sentences to determine if they made sense).

Table 24

Strategy Explanation Scores as a Function of Experimental Condition and Time of Testing

Experimental Condition	Immediate Testing		Delayed Testing	
	$\bar{x}$	SD	$\bar{x}$	SD
Posttest Only	2.375	.770	2.542	.977
Story Exposure	2.042	.908	2.292	.859
Appropriate Standard	2.542	.977	2.833	.816
Appropriate Standard + Story Exposure	2.667	.868	3.083	1.140
Comprehension Monitoring Outcome Knowledge	3.375	.770	3.417	.974
Comparison Training	3.917	.282	3.833	.482
Comparison + Monitoring Training	5.667	.917	5.250	1.110
Comparison + Monitoring + Self-Instruction Training	5.750	1.480	5.542	1.250

n = 24 per condition.

Maximum score = 7.

In contrast, more sophisticated strategy use occurred in the four training conditions, with greater training associated with greater strategy use. Children in the Comprehension Monitoring Outcome Knowledge condition typically reported using a non-specific evaluation strategy, while children in the Comparison training condition typically reported using a comparison strategy (i.e., comparing sentence pairs to determine if they made sense together). Children in both the Comparison + Monitoring and the Comparison + Monitoring + Self-Instruction training conditions reported using more sophisticated strategies. Typically, the strategies reported by children in these conditions ranged from a checking back strategy to determine if 'just heard' information makes sense with 'previously heard' information, to using both the comparison and checking back strategies.

Dunn's comparisons on the strategy explanation scores are presented in Table 25. There were no significant differences between the strategy explanations given by children in the Appropriate Standard of Evaluation condition and the three other control groups (i.e, Posttest Only, Story Exposure and Appropriate Standard of Evaluation + Story Exposure) at either immediate or delayed testing. However, the children in all four training conditions reported significantly greater use of strategies considered critical to efficient listening comprehension monitoring, than did children in the Appropriate Standard of Evaluation condition.

A further measure of strategy use was derived from presenting each child with a copy of the final inconsistent passage, and asking for a demonstration of the strategies employed while processing the passage. Table 26 presents the means and standard deviations for the strategy demonstration scores across conditions. Again, there was more

Table 25

Dunn's Comparisons of Strategy Explanation Scores Relative to the Appropriate Standard of Evaluation Condition

Comparisons	t - values Immediate Testing[a]	Delayed Testing[b]
Standard vs. Posttest Only	.625	1.032
Standard vs. Story Exposure	1.873	1.918
Standard vs. Standard + Story Exposure	-.468	-.887
Standard vs. Comprehension Monitoring Outcome Knowledge	-3.120*	-2.071*
Standard vs. Comparison Training	-5.150*	-3.546*
Standard vs. Comparison + Monitoring Training	-11.704*	-8.571*
Standard vs. Comparison + Monitoring + Self-Instruction Training	-12.C15*	-9.606*

* critical t-value = 1.983 at p < .049.

[a]MSE = .854. [b]MSE = .954.

Table 26

Strategy Demonstration Scores as a Function of Experimental Condition and Time of Testing

Experimental Condition	Immediate Testing		Delayed Testing	
	$\bar{x}$	SD	$\bar{x}$	SD
Posttest Only	2.042	.908	2.333	.868
Story Exposure	1.542	.833	1.917	.504
Appropriate Standard	2.292	.908	2.417	.584
Appropriate Standard + Story Exposure	2.375	.824	2.958	1.120
Comprehension Monitoring Outcome Knowledge	2.542	1.100	2.833	1.310
Comparison Training	3.292	.955	3.375	1.310
Comparison + Monitoring Training	4.750	1.700	4.583	1.610
Comparison + Monitoring + Self-Instruction Training	4.625	1.660	4.750	1.510

n = 24 per condition.

Maximum score = 6.

sophisticated strategy use by children in the training conditions than in the control groups. The majority of the control children demonstrated strategies assumed not to be helpful on the task. The control children reported strategies that ranged from simply listening to each part of the story to determine if it made sense, to thinking about each sentence pair to evaluate if they made sense. The most common type of strategy reported by the control children was the miscellaneous strategy. Thus, the control children typically made comments or asked questions about the sentence pairs, formed mental images of the information that was presented, or repeated the information etc.

While the children in the training conditions did report using more sophisticated strategies than children in the control groups on average, this contrast was not as marked as on the strategy explanation measure. Children in the Comprehension Monitoring Outcome Knowledge condition demonstrated strategies that ranged from inappropriate to the task (i.e., miscellaneous strategies) to a non-specific evaluation strategy. Children in the Comparison training condition typically indicated that they used a non-specific evaluation strategy after hearing each sentence pair (i.e., they indicated thinking about the sentences to determine if they made sense and did not mention comparing the sentences). Children in the Comparison + Monitoring and the Comparison + Monitoring + Self-Instruction conditions typically demonstrated strategies that ranged from comparing the sentences to determine if they made sense together, to checking back to determine if the sentence pair was consistent with previous sentence pairs.

Dunn's comparisons of the strategy demonstration scores are reported in Table 27. As with the strategy explanation measure, there were no significant differences between the strategies demonstrated by the children in the Appropriate Standard of Evaluation condition and the Posttest Only and Appropriate Standard of Evaluation + Story Exposure conditions at both testing times. However, children in the Appropriate Standard of Evaluation condition exhibited significantly more sophisticated strategies on the demonstration measure than children in the Story Exposure condition at immediate testing. However, both groups reported strategies that were assumed not to be helpful on the task.

There were no significant differences between the strategy demonstration scores of the children in the Appropriate Standard of Evaluation and Comprehension Monitoring Outcome Knowledge conditions at either testing time. This finding is in direct contrast to the results of the strategy explanation measure. Children in the three active training conditions (i.e., Comparison, Comparison + Monitoring, Comparison + Monitoring + Self-Instruction) demonstrated significantly more sophisticated strategies than the children in the Appropriate Standard of Evaluation condition. This finding was consistent with the results of the strategy explanation measure. It may be that the strategy demonstration is a less sensitive measure of strategy usage than the strategy explanation measure. As discussed previously in the method section, the range of response variability for the strategy demonstration measure was restricted by a combination of the nature of the instructional procedures and the manner of scoring (i.e., only a maximum score of 6 was possible on this measure).

Table 27

Dunn's Comparisons of Strategy Demonstration Scores

Relative to the Standard of Evaluation Condition

Comparisons	t - values	
	Immediate Testing[a]	Delayed Testing[b]
Standard vs. Posttest Only	.746	.249
Standard vs. Story Exposure	2.239*	1.484
Standard vs. Standard + Story Exposure	-.248	-1.605
Standard vs. Comprehension Monitoring Outcome Knowledge	-.746	-1.234
Standard vs. Comparison Training	-2.985*	-2.843*
Standard vs. Comparison + Monitoring Training	-7.337*	-6.427*
Standard vs. Comparison + Monitoring + Self-Instruction Training	-6.969*	-6.923*

* critical t-value = 1.983 at $p < .049$.

[a]MSE = 1.349 [b]MSE = 1.363.

A final strategy use measure was the manner in which the children handled the inconsistency in the inconsistent passage. The sixth sentence pair that was presented (i.e., when the copy of the inconsistent passage was presented to obtain the strategy demonstration measure) contained inconsistent sentences (i.e., sentences 6a and 6b). Each child's handling of the inconsistency was scored on a 6-point scale, based on the combinations of sentences relevant to the inconsistency (i.e., combinations of sentences 5a through 6b) that were mentioned by the child when s/he indicated that this part of the story did not make sense. Table 28 lists the means and standard deviations for the handling of the inconsistency measure across groups at both testing times.

From Table 28 it appears that at immediate testing children in the Appropriate Standard of Evaluation condition typically included information from sentences 6a and 6b (i.e., score of 1), while children in the Comparison + Monitoring and Comparison + Monitoring + Self-Instruction training conditions included information from sentences 6b and 5a or 5b (i.e., score of 2). These patterns were repeated by both the Appropriate Standard of Evaluation control group and the Comparison + Monitoring + Self-Instruction training group at delayed testing.

Table 29 presents the results of the Dunn's comparisons of the handling of the inconsistency scores. While none of the comparisons are significant, some trends are apparent from this analysis. At immediate testing there is a trend toward children in both the Comparison + Monitoring and the Comparison + Monitoring + Self-Instruction training conditions including more information from more of the relevant sentences than children in the Appropriate Standard of Evaluation

Table 28

Handling of Inconsistency Scores on the Final Inconsistent Passage as a Function of Experimental Condition and Time of Testing

Experimental Condition	Immediate Testing		Delayed Testing	
	$\bar{x}$	SD	$\bar{x}$	SD
Posttest Only	.750	1.150	.958	1.400
Story Exposure	.500	1.180	.667	1.200
Appropriate Standard	1.333	1.430	1.292	1.570
Appropriate Standard + Story Exposure	1.333	1.520	.917	1.350
Comprehension Monitoring Outcome Knowledge	1.417	1.770	.792	.588
Comparison Training	1.125	1.360	1.667	1.810
Comparison + Monitoring Training	2.167	1.710	1.583	1.820
Comparison + Monitoring + Self-Instruction Training	2,042	1.570	2.125	1.650

n = 24 per condition.

Maximum score = 6.

Table 29

Dunn's Comparisons of the Handling of Inconsistency Scores on the Final Inconsistent Passage Relative to the Appropriate Standard of Evaluation

Comparisons	t - values	
	Immediate Testing[a]	Delayed Testing[b]
Standard vs. Posttest Only	1.369	.786
Standard vs. Story Exposure	1.955	1.471
Standard vs. Standard + Story Exposure	.000	.882
Standard vs. Comprehension Monitoring Outcome Knowledge	-.197	1.176
Standard vs. Comparison Training	.488	-.882
Standard vs. Comparison + Monitoring Training	-1.958	-.685
Standard vs. Comparison + Monitoring + Self-Instruction Training	-1.664	-1.960

* critical t-value = 1.983 at $p < .049$.

[a]MSE = 2.180. [b]MSE_3 = 2.168.

condition. This trend also occurred in the handling of inconsistency scores of the Comparison + Monitoring + Self-Instruction training condition compared to the Appropriate Standard of Evaluation at delayed testing.

Memory Measures

Recall data were collected on the final inconsistent passage presented to the children at immediate and delayed testing. Each child's passage recall was scored according to the number of idea units recalled, out of a possible total of 17. Table 30 presents the means and standard deviations for this recall data as a function of condition and time of testing. None of the children in any of the experimental conditions approached the ceiling on this measure. Mean recall scores across conditions ranged from 3.500 to 5.792 at immediate testing, and from 3.667 to 5.750 at delayed testing.

Table 31 presents the results of the Dunn's comparisons of the total recall scores. The only significant finding was that the children in the Appropriate Standard of Evaluation condition recalled significantly more passage details at immediate testing than children in the Story Exposure and Comprehension Monitoring Outcome Knowledge conditions.

To provide a finer analysis of the children's recall of the final inconsistent passage, the number of relevant details (i.e., sentences relevant to the inconsistency-specifically sentences 5a through 6b) recalled on the final inconsistent passage were analyzed. Thus, the maximum score on this recall measure was 4. Table 32 presents the means and standard deviations for recall of relevant details from the final inconsistent passage at both testings.

Table 30

Total Recall Scores on the Final Inconsistent Passage as a Function of Experimental Condition and Time of Testing

Experimental Condition	Immediate Testing		Delayed Testing	
	$\bar{x}$	SD	$\bar{x}$	SD
Posttest Only	4.042	1.550	4.250	2.270
Story Exposure	3.500	2.380	3.667	2.100
Appropriate Standard	5.167	2.330	4.542	2.770
Appropriate Standard + Story Exposure	3.958	1.550	4.458	2.060
Comprehension Monitoring Outcome Knowledge	3.875	2.030	4.500	2.430
Comparison Training	5.208	2.470	4.083	2.320
Comparison + Monitoring Training	5.583	2.950	5.167	2.330
Comparison + Monitoring + Self-Instruction Training	5.792	2.040	5.750	2.560

n = 24 per condition.

Maximum score = 17.

Table 31

Dunn's Comparisons of Total Recall Scores on the Final Inconsistent Passage Relative to the Appropriate Standard of Evaluation Condition

Comparisons	t - values	
	Immediate Testing[a]	Delayed Testing[b]
Standard vs. Posttest Only	1.766	.428
Standard vs. Story Exposure	2.617*	1.281
Standard vs. Standard + Story Exposure	1.898	.123
Standard vs. Comprehension Monitoring Outcome Knowledge	2.028*	.061
Standard vs. Comparison Training	-.064	.672
Standard vs. Comparison + Monitoring Training	-.653	-.915
Standard vs. Comparison + Monitoring + Self-Instruction Training	-.981	-1.769

* critical *t*-value = 1.983 at $p < .049$.

[a]MSE = 4.873. [b]MSE = 5.594.

Table 32

Recall of Relevant Detail Scores on the Final Inconsistent Passage as a Function of Experimental Condition and Time of Testing

Experimental Condition	Immediate Testing		Delayed Testing	
	$\bar{x}$	SD	$\bar{x}$	SD
Posttest Only	.958	.751	1.042	.955
Story Exposure	.708	.908	1.167	.917
Appropriate Standard	.875	.900	1.125	.947
Appropriate Standard + Story Exposure	.625	.770	.667	.761
Comprehension Monitoring Outcome Knowledge	.917	.830	1.042	1.080
Comparison Training	1.333	1.090	1.083	1.140
Comparison + Monitoring Training	1.708	1.080	1.417	1.020
Comparison + Monitoring + Self-Instruction Training	1.542	.833	1.875	1.030

n = 24 per condition.

Maximum score = 4.

Dunn's comparisons of relevant details recalled on the final passage are presented in Table 33. There were no significant differences at either immediate or delayed testing in the number of relevant details recalled by children in the Appropriate Standard of Evaluation condition and any of the control, Comprehension Monitoring Outcome Knowledge, or Comparison training conditions. However, at immediate testing the children in the Comparison + Monitoring and the Comparison + Monitoring + Self-Instruction conditions recalled significantly more details relevant to the inconsistency than did the Appropriate Standard of Evaluation subjects. However, only the children assigned to the Comparison + Monitoring + Self-Instruction training condition maintained this superior performance on the delayed test.

Discriminative Monitoring Measures

On the monitoring version of the reading comprehension task the children were asked to indicate the strategy and criterion they would use if they were required to read the story to find any sentences that do not belong. Table 34 presents the proportion of children in each condition at both testing times who reported an appropriate strategy (e.g., comparing the sentences or checking back to ensure that all the sentences made sense together), and criterion (e.g., sentences do not belong in the story if they present conflicting or unrelated information in relation to the other sentences), respectively.

Table 35 presents the Z values for the comparisons of the proportions of children reporting the appropriate strategy and criterion on the monitoring version of the reading comprehension task. A significantly greater proportion of children in the Comparison training

Table 33

Dunn's Comparisons of Relevant Detail Scores on the Final Inconsistent Passage Relative to the Appropriate Standard of Evaluation Condition

Comparisons	t - values: Immediate Testing[a]	t - values: Delayed Testing[b]
Standard vs. Posttest Only	-.318	.291
Standard vs. Story Exposure	.640	-.147
Standard vs. Standard + Story Exposure	.958	1.607
Standard vs. Comprehension Monitoring Outcome Knowledge	-.161	.291
Standard vs. Comparison Training	-1.755	.147
Standard vs. Comparison + Monitoring Training	-3.192*	-1.025
Standard vs. Comparison + Monitoring + Self-Instruction Training	-2.556*	-2.632*

* critical t-value = 1.983 at $p < .049$.

[a]MSE = .816. [b]MSE = .975.

Table 34

Proportion of Children Reporting Appropriate Strategy and Criterion on the Reading Comprehension Monitoring Task as a Function of Experimental Condition and Time of Testing

Experimental Condition	Immediate Testing		Delayed Testing	
	Strategy	Criterion	Strategy	Criterion
Posttest Only	.000	.667	.167	.417
Story Exposure	.000	.417	.000	.500
Appropriate Standard	.083	.917	.083	.750
Appropriate Standard + Story Exposure	.250	.917	.250	.667
Comprehension Monitoring Outcome Knowledge	.083	.833	.167	.500
Comparison Training	.583	.667	.500	.667
Comparison + Monitoring Training	.333	.667	.083	.667
Comparison + Monitoring + Self-Instruction Training	.333	.833	.417	.750

n = 24 per condition with 12 at each testing time.

Table 35

Comparisons of Proportion of Children Reporting Appropriate Strategy and Criterion on the Reading Comprehension Monitoring Task Relative to the Appropriate Standard of Evaluation Condition

Comparisons	z - values			
	Immediate Testing		Delayed Testing	
	Strategy[a]	Criterion[b]	Strategy[c]	Criterion[d]
Standard vs. Posttest Only	.500	1.397	-.506	1.673
Standard vs. Story Exposure	.500	2.793*	.500	1.256
Standard vs. Standard + Story Exposure	-1.006	.000	-1.006	.417
Standard vs. Comprehension Monitoring Outcome Knowledge	.000	.469	-.506	1.256
Standard vs. Comparison Training	-3.012*	1.397	-2.512*	.417
Standard vs. Comparison + Monitoring Training	-1.506	1.397	.000	.417
Standard vs. Comparison + Monitoring + Self-Instruction Training	-1.506	.469	-2.012*	.000

* critical z-value = 1.983 at $p < .049$.

[a]SE = .166. [b]SE = .179. [c]SE = .166. [d]SE = .199.

condition reported an appropriate strategy at both immediate and delayed testing compared to the Appropriate Standard of Evaluation control group. Also, at delayed testing only, a significantly greater proportion of children in the Comparison + Monitoring + Self-Instruction training group reported an appropriate strategy relative to the children in the Appropriate Standard of Evaluation control condition. There were no significant differences on the criterion measure for the planned comparisons involving the training conditions. However, a significantly greater proportion of children in the Appropriate Standard of Evaluation control group reported an appropriate criterion relative to the children in the Story Exposure group. This difference was significant only at immediate testing.

On the non-monitoring version of the reading comprehension task the children were asked to indicate the strategy and criterion they would use if they were asked to read the story to find any spelling mistakes. Table 36 presents the proportion of children in each condition at both testing times who reported an appropriate strategy (e.g., read or look at each word carefully) and criterion (e.g., the word would be a spelling mistake if s/he knew it was spelled incorrectly, or if it did not sound like a word etc.). From Table 36 it is apparent that while there is variability across groups in the proportion of children who indicated an appropriate strategy on the non-monitoring reading comprehension task, virtually all the children across all the conditions reported an appropriate criterion for judging if a word was a spelling mistake.

Table 37 presents the results of the planned proportional analysis of children reporting appropriate strategy and criterion responses on

Table 36

Proportion of Children Reporting Appropriate Strategy and Criterion on the Reading Comprehension Nonmonitoring Task as a Function of Experimental Condition and Time of Testing

Experimental Condition	Immediate Testing		Delayed Testing	
	Strategy	Criterion	Strategy	Criterion
Posttest Only	.417	1.000	.500	.917
Story Exposure	.667	1.000	.500	.917
Appropriate Standard	.583	1.000	.667	1.000
Appropriate Standard + Story Exposure	.333	.917	.750	.917
Comprehension Monitoring Outcome Knowledge	.500	1.000	.417	.917
Comparison Training	.417	.917	.750	1.000
Comparison + Monitoring Training	.333	1.000	.417	1.000
Comparison + Monitoring + Self-Instruction Training	.917	1.000	.333	1.000

n = 24 per condition with 12 at each testing time.

Table 37

Comparisons of Proportion of Children Reporting Appropriate Strategy and Criterion on the Reading Comprehension Nonmonitoring Task Relative to the Appropriate Standard of Evaluation Condition

Comparisons	z - values			
	Immediate Testing		Delayed Testing	
	Strategy[a]	Criterion[b]	Strategy[c]	Criterion[d]
Standard vs. Posttest Only	.814	.000	.823	1.012
Standard vs. Story Exposure	-.412	.000	.823	1.012
Standard vs. Standard + Story Exposure	1.225	1.407	-.409	1.012
Standard vs. Comprehension Monitoring Outcome Knowledge	.407	.000	1.232	1.012
Standard vs. Comparison Training	.814	1.407	-.409	.000
Standard vs. Comparison + Monitoring Training	1.225	.000	1.232	.000
Standard vs. Comparison + Monitoring + Self-Instruction Training	-1.637	.000	1.645	.000

* critical $\underline{z}$-value = 1.983 at $\underline{p} < .049$.

[a]SE = .204. [b]SE = .058. [c]SE = .203. [d]SE = .082.

the reading comprehension non-monitoring task. There are no significant differences between the proportions of children in the Appropriate Standard of Evaluation condition who gave appropriate strategy and criterion responses, and any of the other experimental conditions.

On the monitoring version of the referential communication task the children were presented with a card containing drawings of a small pink-striped triangle, a small pink-striped circle, and a large blue-striped triangle. The children were asked what they would do if they were asked to point to the striped triangle. Table 38 presents the proportion of children who indicated an appropriate response (e.g., refused to select a triangle until further information was provided) on the referential communication monitoring task at immediate and delayed testing. Across all experimental conditions only a small proportion (range from .083 to .417) of the children correctly monitored the task requirements.

The results of the planned comparisons on the referential communication non-monitoring task responses are presented in Table 39. There were no significant differences between the Appropriate Standard of Evaluation control group and any other experimental condition.

On the non-monitoring version of the referential communication task the children were presented with the drawings of the geometric shapes and asked what they would do if they had to remember the designs. Table 40 presents the proportion of children who indicated an appropriate response (e.g., indicated they would use an appropriate mnemonic aid such as rehearsal, imagery etc.) on the referential communication non-monitoring task. The results of the planned proportional analyses

Table 38

Proportion of Children Indicating Appropriate Responses on the Referential Communication Monitoring Task as a Function of Experimental Condition and Time of Testing

Experimental Condition	Immediate Testing	Delayed Testing
Posttest Only	.617	.167
Story Exposure	.083	.083
Appropriate Standard	.167	.333
Appropriate Standard + Story Exposure	.333	.083
Comprehension Monitoring Outcome Knowledge	.167	.250
Comparison Training	.333	.417
Comparison + Monitoring Training	.417	.250
Comparison + Monitoring + Self-Instruction Training	.417	.250

n = 24 per condition.

Table 39

Comparisons of the Proportion of Children Indicating Appropriate Responses on the Referential Communication Monitoring Task Relative to the Appropriate Standard of Evaluation Condition

Comparisons	z - values	
	Immediate Testing[a]	Delayed Testing[b]
Standard vs. Posttest Only	.000	.965
Standard vs. Story Exposure	.469	1.453
Standard vs. Standard + Story Exposure	-.927	1.453
Standard vs. Comprehension Monitoring Outcome Knowledge	.000	.483
Standard vs. Comparison Training	-.927	-.488
Standard vs. Comparison + Monitoring Training	-1.397	.483
Standard vs. Comparison + Monitoring + Self-Instruction Training	-1.397	.483

* critical z-value = 1.983 at $p < .049$.

[a]SE = .179. [b]SE = .172.

Table 40

Proportion of Children Indicating Appropriate Responses on the Referential Communication Nonmonitoring Task as a Function of Experimental Condition and Time of Testing

Experimental Condition	Immediate Testing	Delayed Testing
Posttest Only	.583	.333
Story Exposure	.667	.417
Appropriate Standard	.917	.667
Appropriate Standard + Story Exposure	.583	.583
Comprehension Monitoring Outcome Knowledge	.583	.750
Comparison Training	.667	.667
Comparison + Monitoring Training	.583	.583
Comparison + Monitoring + Self-Instruction Training	.417	.583

n = 24 per condition with 12 at each testing time.

are presented in Table 41. The only significant finding to emerge was that a greater proportion of children in the Appropriate Standard of Evaluation condition reported appropriate strategies relative to children in the Comparison + Monitoring + Self-Instruction training group at immediate testing.

Table 41

Comparisons of the Proportion of Children Indicating Appropriate Responses on the Referential Communication Nonmonitoring Task Relative to the Appropriate Standard of Evaluation Condition

Comparisons	z - values: Immediate Testing[a]	z - values: Delayed Testing[b]
Standard vs. Posttest Only	1.695	1.653
Standard vs. Story Exposure	1.269	1.238
Standard vs. Standard + Story Exposure	1.695	.416
Standard vs. Comprehension Monitoring Outcome Knowledge	1.695	-.411
Standard vs. Comparison Training	1.269	.000
Standard vs. Comparison + Monitoring Training	1.695	.416
Standard vs. Comparison + Monitoring + Self-Instruction Training	2.538*	.416

* critical z-value = 1.983 at $p < .049$.

[a]SE = .197. [b]SE = .202.

DISCUSSION

It has been estimated that children listen for nearly 60% of the school day (Wilt, 1950). Given that children spend more time listening than reading, writing or speaking, it is not surprising that listener skills are good predictors of children's academic performances (Atkin, Bray, Davison, Herberger, Humphreys, & Selzer, 1977). While of obvious academic importance, listening skills are not taught in the schools, and very few researchers have studied listening skills (see Landry, 1979; Lundsteen, 1979 for a discussion). This dismal state of listening strategy instruction is reflected in a recent study by Tompkins, Friend and Smith (1984).

Tompkins et al. (1984) interviewed children in grades kindergarten through eight to examine the children's metacognitive knowledge about listening. When queried as to the purposes of listening 84% of the children stated that listening was important to acquire information and for learning, and many students specified school learning. When asked about specific listening strategies an overwhelming 74% of the children's responses were categorized as school admonitions (e.g., "be quiet", "turn on your ears"). The majority of the children stated that no one (39%) or their parents (34%) had taught them how to listen. When asked specifically what their teachers had taught them about listening 32% did not know, and 11% stated the teacher had not taught them about listening. The most frequent responses to this query were school admonitions (40%), and consequences for listening/not listening (37%) (e.g., "if you don't listen you'll get bad marks"). One percent of the children stated that their teachers had taught them a listening strategy (e.g., taking notes, repeating information etc.).

4 OF / DE 4

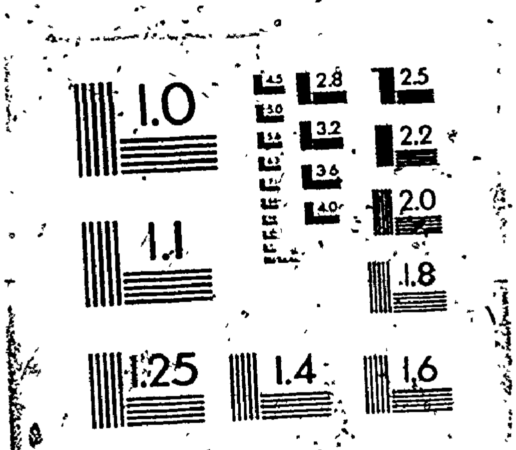


Table F-14

Number of Children in the Comparison Training Group Obtaining Various Strategy Demonstration Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Demonstration Score

	6	5	4	3	2	1	0
4		1	4	1	2		
3			5	2	3		
2			3	1	1		
1					1		
0							

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Demonstration Score

	6	5	4	3	2	1	0
4	1		6	3	1		
3			3	2	2		
2	1		2		2		
1							1
0							

Table F-15

Number of Children in the Comparison + Monitoring Training Group Obtaining Various Strategy Demonstration Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Demonstration Score

	6	5	4	3	2	1	0
4	10	1		2	3		
3	4	1			2		
2			1				
1							
0							

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Demonstration Score

	6	5	4	3	2	1	0
4	4	2	2	1	1		
3	4		1	1	1	1	
2	1	3			1		
1	1						
0							

Table F-16

Number of Children in the Comparison + Monitoring + Self-Instruction Training Group Obtaining Various Strategy Demonstration Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score	Strategy Demonstration Score: 6	5	4	3	2	1	0
4	6	4	2		4		
3	4	1			2		
2	1						
1							
0							

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score	Strategy Demonstration Score: 6	5	4	3	2	1	0
4	9	5	1	1	3		
3	2		2		1		
2							
1							
0							

VITA

NAME:	Darlene Judith Elliott-Faust
PLACE OF BIRTH:	Cambridge, Ontario, Canada
YEAR OF BIRTH:	1955
POST-SECONDARY EDUCATION AND DEGREES:	University of Western Ontario, London, Ontario 1973-1977 B.A. (Honours)
	University of Waterloo, Waterloo, Ontario 1978-1980 M.A.Sc.
	University of Western Ontario London, Ontario 1980-1984 Ph.D.
HONOURS AND AWARDS:	Dean's Honours List, University of Western Ontario 1974-1977
	University of Waterloo Scholarship 1978-1979
	I.O.D.E. Gladys Raiter Bursary 1979-1980
	University of Waterloo Scholarship 1979-1980
	Ontario Graduate Scholarship 1980-1981
	I.O.D.E. War Memorial Doctoral Scholarship 1980-1982
	Social Sciences and Humanities Research Council of Canada Doctoral Fellowship 1981-1984
RELATED WORK EXPERIENCE:	Teaching Assistant University of Waterloo Waterloo, Ontario 1978-1980
	Psychology Intern Kitchener-Waterloo Hospital Kitchener, Ontario 1979

Teaching Assistant
University of Western Ontario
London, Ontario
1980-1983

Psychometrist
Education Clinic
University of Western Ontario
London, Ontario
1980

Psychology Intern
Children's Psychiatric Research Institute
London, Ontario
1981

Child Clinical Workshop Series Coordinator
University of Western Ontario
London, Ontario
1981-1982

Psychology Intern
War Memorial Children's Hospital
London, Ontario
1982

Research Co-Supervisor
4th year Honours student
University of Western Ontario
London, Ontario
1983-1984

Employment Search Committee for Applied Psychological Environments
Committee Member
University of Western Ontario
London, Ontario
1983-1984

Psychometrist
Children's Psychiatric Research Institute
London, Ontario
1983-present

PUBLICATIONS:

Koverola, C., Elliott-Faust, D., & Wolfe, D. A. (In Press). Clinical issues in the behavioral treatment of a child abusive mother experiencing multiple life stresses. Journal of Clinical Child Psychology.

Pressley, M., Forrest-Pressley, D. L., Elliott-Faust, D. J. (In Press). How to study strategy instructional enrichment: Illustrations from research on children's prose memory and comprehension. In F. Weinert & M. Perlmutter (Eds.), Memory development: The Ringberg Conference. Hillsdale, N.J.: Erlbaum & Associates.

Pressley, M., Forrest-Pressley, D. L., Elliott-Faust, D. J., & Miller, G. (In Press). Children's use of cognitive strategies, how to teach strategies, and what to do if they can't be taught. In M. Pressley & C. J. Brainerd (Eds.), Cognitive approaches to memory development. New York: Springer-Verlag.

END

12-11-85

FIN

Thus, the most parsimonious explanation for the present findings is that the training modified the manner in which the children in the Comparison + Monitoring + Self-Instruction condition processed the passages, which produced enhanced listening comprehension monitoring performances. Alternate explanations of the present findings are less feasible. It is difficult to explain the results of the present study in terms of increased motivation on the part of the children in the Comparison + Monitoring + Self-Instruction training group. Historically, manipulations of this variable have not resulted in enhanced strategic performances in children (e.g., Lepper & Green, 1978). The issue of differential instruction time was addressed previously, and it was pointed out that the critical factor in instructional research is exposure to criterion task materials, which was equal across conditions. On the other side of the differential instruction time issue, it could be argued that the children in the Comparison + Monitoring + Self-Instruction training condition would be more fatigued by the longer training session, which should depress their performances.

It could be proposed that the children who did not detect the passage inconsistencies were making inferences to account for the contradictory information. For example, in the 'Sea horses' passage the children were told that the sea horse is not a fast swimmer, it makes jerky movements as it swims, and it moves slowly through the water. Then the children heard the sea horse escapes its enemies by quickly swimming away. Perhaps, the children inferred that sea horses are usually slow, unskilled swimmers but when they are frightened (i.e., in the presence of an enemy) they are able to swim quickly. This argument is difficult to support for two reasons:

(1) the research on children's inferencing abilities consistently reports that young children are poor at making inferences under conditions where the propositions are embedded in text and integration of information is required (cf. Johnson & Smith, 1981); and (2) these inferences made by the children should be evident in their recall of the passage details, and this simply never occurred.

A differential involvement of the subjects or feedback position is also difficult to support. Across the three active training conditions (i.e., Comparison, Comparison + Monitoring, and Comparison + Monitoring + Self-Instruction training group) all the children were required to be actively involved in evaluating the passages, and were guided (i.e., given feedback) to produce accurate summary evaluations of the passages. However, only the children trained in the comparison and monitoring strategies evidence enhanced performances, and this performance was maintained by the children also trained in the self-instruction strategy.

Finally, it is generally accepted that increasing the knowledge base can enhance performance even when stragtegic processing is low (Chi, Glaser, & Rees, 1982). There is supportive evidence for this position in the comprehension monitoring literature. Recall that even young children could monitor for inconsistencies if they were presented in the context of experiences with which they were familiar (i.e., high knowledge base) (cf. Tunmer et al., 1983). However, it is impossible to account for the effects of the present study by citing an increased knowledge base because: 1) the children's knowledge concerning the inconsistent information in the passages was low as determined during the passage validation studies (see Appendix C); and 2) it is difficult to conceive of how the training procedures might have altered the children's knowledge base.

Thus, four reasonable conclusions follow from the present study: 1) young children typically do not possess an appropriate standard of evaluation, but the provision of an appropriate standard improves their listening comprehension monitoring; 2) training in comparison and monitoring strategies is sufficient to promote enhanced listening comprehension monitoring performances in young children; 3) the self-instruction component in training promotes maintenance of efficient listening comprehension monitoring performances over time; and 4) the most potent instructional components studied here, in promoting efficient listening comprehension monitoring include an appropriate standard of evaluation, and training in the comparison, monitoring and self-instruction strategies that permit efficient application of the standard while monitoring comprehension.

Miller (1984), in an extension of her 1982 work, cited previously, provides additional support for the present finding of the efficacy of including a criterion of evaluation, and strategy training in the context of a self-instructional training paradigm to promote durable comprehension monitoring performances in young children. Miller (1984) examined the effects of various instructional manipulations on the reading comprehension monitoring performances of average fourth graders. As in the present study, an error detection paradigm was employed.

In Miller's (1984) study children were randomly assigned to one of the following experimental conditions: (1) Practice Control -- were simply exposed to the reading passages but received no instruction; (2) Specific Self-Instruction group -- were provided with an appropriate standard of evaluation and instructed to utilize task-specific self-verbalizations; (3) Didactic Instruction -- received the same instructional content as children in the Specific-Instruction condition but were not taught to utilize self-verbalizations (i.e., instructions worded in the second person); and (4) General Self-Instruction -- provided with an appropriate standard of evaluation, and instructed to utilize general guiding statements as well as task-specific statements within the self-verbalization routine.

There are obvious parallels between Miller's (1984) groups and the groups included in the present study. The Practice control condition is identical to the Story Exposure group, with both conditions controlling for exposure to experimental materials. The Didactic Instruction condition parallels the Comprehension Monitoring Outcome Knowledge condition, with both groups included to address the issue of active versus passive training procedures. Finally, the General Self-Instruction group is comparable to the Comparison + Monitoring + Self-Instruction condition, with both groups trained to employ general problem-solving self-statement, as well as task-specific strategies.

Miller (1984) had each child complete the reading comprehension monitoring task immediately following training and after a three week delay. Parallels between Miller's (1984) findings and those of the present study can be summarized as follows: (1) children in both self-instructional conditions performed significantly better than children in the practice control condition at immediate and delayed testing which parallels the finding of the superior performance of the Comparison + Monitoring + Self-Instruction condition relative to the Story Exposure condition which was maintained at delayed testing; (2) children in the General Self-Instruction condition outperformed the children in the Didactic Instruction group at both testing times which parallels the superior performance of the Comparison + Monitoring + Self-Instruction training condition relative to the Comprehension Monitoring Outcome Knowledge condition. Miller (1984) also reported that while there were no significant differences between the performances of the children in the Specific Self-Instruction and Didactic Instruction conditions at immediate testing, significant differences did emerge at delayed testing.

Miller (1984) interprets these findings as clear support for active versus passive training procedures, and for the inclusion of general and task-specific self-statements to promote superior maintenance.

Other investigators including Bender (1976), Kendall and Wilcox (1980), Meichenbaum and Asarnow (1979), and Schleser, Meyers and Cohen (1981), along with Miller (1984) and the present findings provide strong support for the importance of active involvement of the child in training via self-verbalization, and the inclusion of general problem-solving self-statements in addition to task-specific statements in the promotion of enhanced, durable training effects.

Returning to the present research, an added dimension of the study was the posttask interview conducted at both testing times which provided additional support for the relative superiority of the Comparison + Monitoring + Self-Instruction training condition. One of the series of questions asked during the interview was aimed at assessing the children's conception of sense, particularly the criterion they employed while evaluating the passages. Children in the Appropriate Standard of Evaluation condition scored higher on the concept of sense measure than children in the control groups who were not provided with an appropriate standard of evaluation (i.e., Posttest

Only and Story Exposure groups). Without instruction young children seem not to possess an adequate standard of evaluation to judge passage comprehensibility. However, there were no significant differences between the scores of the children in the Appropriate Standard of Evaluation condition and <u>any</u> of the other experimental conditions provided the standard of evaluation. Thus, all the children who were provided an appropriate standard of evaluation possessed an equivalent criterion for assessing the passages. The results cannot be explained by differential concepts of sense, or differences in standards of evaluation employed by the children.

Three measures of strategy use were collected during the posttask interview. The children were presented the final inconsistent passage and were: 1) asked to explain the strategy they used while assessing the passage (strategy explanation measure); 2) were presented with a typed copy of the passage and asked to verbalize their thinking after each sentence pair was presented (strategy demonstration measure); and 3) were required to specify how they handled the inconsistency when the two contiguous sentences were encountered in the passage (handling of inconsistency measure). The children's responses on the strategy explanation and strategy demonstration measures were scored according to the inclusion of the strategies studied here that promote efficient listening comprehension monitoring (i.e., comparison, monitoring and self-instruction strategies). On both the strategy explanation and strategy demonstration measures, the children in the three active training conditions (i.e., Comparison training, Comparison + Monitoring training, and Comparison + Monitoring + Self-Instruction training) consistently reported a significantly greater number of relevant strategies compared to children in the Appropriate Standard of Evaluation condition.

The handling of the inconsistency measure was scored according to the number of sentences the child included in his/her explanation of the inconsistency. There were no significant differences between the Appropriate Standard of Evaluation condition and any of the other experimental conditions on this measure at either time of testing. However, at immediate testing there was a trend for the children in the Comparison + Monitoring and Comparison + Monitoring + Self-Instruction conditions to include more of the critical sentences (i.e., three consistent sentences and one inconsistent sentences) in their explanations of how they handled the inconsistency than the children in the Appropriate Standard of Evaluation condition. The children in the Comparison + Monitoring + Self-Instruction training condition maintained this trend at delayed testing.

Thus, while all the children in the training conditions and the Appropriate Standard of Evaluation group employed an equivalent standard of evaluation, significant differences emerged in the nature of the strategies used in applying this standard to judge the comprehensibility of the passages. Given these findings and the superior performances of the Comparison + Monitoring + Self-Instruction training group on the listening comprehension monitoring tasks, further evidence is provided for the important role the appropriate standard and comparison monitoring and self-instruction strategies can play in efficient listening comprehension monitoring performance.

Recall data were collected on the final inconsistent passage that the children heard at each testing. At immediate testing children in the Appropriate Standard of Evaluation condition recalled significantly more passage details than the children in the Story Exposure and

Comprehension Monitoring Outcome Knowledge conditions. No other significant differences emerged on the total recall measure at either testing.

When the children's recall for details relevant to the inconsistency (i.e., the three consistent and one inconsistent sentence) was examined, there were interesting differences. At immediate testing children in the Comparison + Monitoring and Comparison + Monitoring + Self-Instruction conditions recalled significantly more relevant details compared to the children in the Appropriate Standard of Evaluation condition. At delayed testing, only the children in the Comparison + Monitoring + Self-Instruction condition recalled more relevant details than the children in the Appropriate Standard of Evaluation condition.

The more potent training approaches (i.e., Comparison + Monitoring and Comparison + Monitoring + Self-Instruction training) did not enhance overall memory; they probably did produce differential processing of the inconsistent portions of the passages, producing greater recall of relevant details. Therefore, it seems likely that comprehension monitoring training mediates memory rather than the reverse in the situation studied here. To further clarify this finding, it would be instructive to examine the recall data on inconsistent and consistent versions of the same passage across children exposed to the various instructional manipulations (i.e., half the children in each condition would be asked to recall the consistent version of the passage, while the remaining children would recall the inconsistent passage).

The discriminative monitoring tasks were administered at both testing times to assess generalization of training on the monitoring versions of these tasks. No differences between the groups were expected on the nonmonitoring versions of the tasks.

On the monitoring version of the reading comprehension task (i.e., the children were asked to indicate the strategy and criterion they would use to find sentences that did not belong in a story) a significantly greater proportion of the children in the Comparison training condition who were administered this task at immediate testing reported they would use an appropriate strategy relative to the children in the Appropriate Standard of Evaluation condition (.583 versus .083, respectively). For the children who were administered this task at delayed testing significantly greater proportions of children in the Comparison training (.500) and Comparison + Monitoring + Self-Instruction (.417) conditions reported appropriate strategies relative to the children in the Appropriate Standard of Evaluation condition (.083). The comparison and monitoring strategies are effective strategies on this task, and there is evidence of transfer from children in two of the conditions that were taught to use these strategies on the listening comprehension monitoring task. However, the evidence for transfer on this near generalization task were quite modest.

The children were also asked about the criterion they would use in deciding whether sentences did not belong in the story. The criterion the children had been given for judging the comprehensibility of the passages was appropriate, as well as the criterion of false information (e.g., if the sentence said "pigs fly") which control condition children often gave as the criterion they used to judge the comprehensibility of the passages. The only significant difference to emerge was that at immediate testing a greater proportion of the children in the Appropriate Standard of Evaluation gave an appropriate criterion relative to the children in the Story Exposure group. Generally, more than sixty percent of the children in each experimental group reported appropriate criterion when the task was administered at immediate and delayed testing.

On the nonmonitoring version of the reading comprehension task, the children were asked about the strategy and criterion they would use if they had to read a story to find spelling mistakes. No significant differences emerged across conditions in the proportions of children reporting appropriate strategies or criterion. While only half of the children in each condition typically reported they would use an appropriate strategy (e.g., look at each word carefully), more than ninety percent of the children in each condition expressed an appropriate criterion for identifying a spelling mistake (e.g., sound it out, look in the dictionary, etc.).

On the monitoring version of the referential communication task the children were asked to point to the triangle on a sheet which contained a small pink-striped triangle, a small pink-striped circle, and a large blue-striped triangle. No significant differences emerged at either testing time in the proportion of children in each group who indicated they would need more information before making a choice. Typically, very few children in each condition gave an appropriate monitoring response (i.e., proportions ranged from .083 to .417). Thus, on this far generalization task there were no indications that the children transferred the trained monitoring strategies.

On the nonmonitoring version of the referential communication task the children were asked what they would do to remember the geometric designs. When they were administered the task at immediate maintenance a greater proportion of children in the Appropriate Standard of Evaluation condition indicated they would use an appropriate mnenomic relative to the children in the Comparison + Monitoring + Self-Instruction training condition. No differences emerged at delayed testing. Typically, sixty percent or greater of the children in each group reported an appropriate mnemonic strategy (e.g., imagery, rehearsal, etc.).

Thus, while there is some evidence for transfer on a near generalization task, it is obvious that training young children to monitoring their comprehension on listening tasks does not promote optimal comprehension monitoring in other task domains. Given the strong maintenance effects that were produced in the present study, the next step in this program of research is to facilitate the generalization of training. Generalization of training is a central issue in instructional research which historically has eluded investigators (Royer, 1979). In the next section I will address the issue of generalization of training, and the direction the present research will take to meet this goal.

Issue of Generalization

The basic advantage of adopting an instructional methodology is that is allows the researcher to directly test hypotheses concerning specific competencies involved in efficient performance on tasks in a particular skill domain. Three criteria are typically used to assess the effectiveness of instructional procedures: performance on training tasks immediately following training; maintenance of training; and generalization of training (Belmont & Butterfield, 1977; Brown, 1978). Evidence of immediate and maintained performance improvements speak to the adequacy of the instructed components and instructional routines (Belmont & Butterfield, 1977). In the present study there was pervasive evidence that instruction in the comparison and monitoring strategies was sufficient to promote efficient listening comprehension monitoring performances immediately following instruction, while the inclusion of a self-instruction component facilitated maintenance of these training effects.

The most stringent test of the success of an instructional routine is whether the effects of training generalize. Generalization is demonstrated when the subject is able to perform efficiently on tasks that are not similar to those used during training. Tasks used to assess generalization typically employ different stimuli than those used during training, and require a modification of the trained strategy (Belmont & Butterfield, 1977; Borkowski & Cavanaugh, 1979; Brown, 1978). A continuum of generalization tasks can be generated with "near" generalization reflecting minimal changes in the training stimuli and strategy, and "far" generalization reflecting substantial changes (Burger, Blackman, Clark, & Reiss, 1982).

In the present study there was limited evidence for generalization by children in two training conditions (Comparison training and Comparison + Monitoring + Self-Instruction training groups) on a "near" generalization task (i.e., monitoring version of the reading comprehension task), but no evidence on a "far" generalization task (i.e., monitoring version of the referential communication task) in any of the conditions.

It should be noted that the reliability and validity of the discriminative monitoring data are suspect because the children were required to abstract and infer the cognitive processes they <u>might</u> employ on the tasks that were presented. This is in contrast to the type of questioning that was used on all the other items in the experimental interview where the children were asked to reflect on the cognitive processes they <u>had</u> used in completing the listening comprehension monitoring task. Ericsson and Simon (1977, 1984) present a strong case, with empirical verification, of the reliability and validity of the latter type of verbal report data.

This qualification of the present data notwithstanding, the failure to find generalization effects is pervasive in the instructional literature (for reviews and discussions, see Borkowski, in press; Belmont, Butterfield, & Ferretti, 1982; Pressley, 1979). A number of instructional researchers (e.g., Borkowski, in press; Campione, Brown, & Ferrera, 1982) have suggested that generalization failures are due to insufficient knowledge about the trained strategy--that is, insufficient Specific Strategy Knowledge. Taking up this suggestion various investigators have manipulated one facet of Specific Strategy Knowledge, namely, strategy utility information (i.e., the children are informed that using the strategy would improve their performance). In general, these investigators have reported that while specific utility information enhances strategy maintenance there is little evidence of transfer of the strategy to new learning contexts (e.g., Black & Rollins, 1982; Borkowski, Levers, & Gruenenfelder, 1976; Cavanaugh & Borkowski, 1979; Kennedy & Miller, 1976; Lawson & Fuelop, 1980; Ringel & Springer, 1980). However, within the model of metacognition that has guided the present research endeavor, Specific Strategy Knowledge is more broadly conceived than simple utility information.

In the only study of its kind conducted to date, O'Sullivan and Pressley (in press) successfully promoted the generalization of a trained mnemonic strategy (i.e., keyword strategy) by including a specific component in training designed to provide the children with a broad knowledge base about the utility of the strategy on a wide range of tasks--that is, to enhance the entire range of the children's Specific Strategy Knowledge.

O'Sullivan and Pressley (in press) assigned fifth and sixth grade children to one of the following five experimental groups: 1) Control,

2) Instruction, 3) Experience, 4) Elaborated Instruction, and 5) Elaborated Instruction Plus Experience. All the children, except those in the Control group, initially received explicit, detailed instruction and practice in the use of the keyword strategy with city-product pairs. Following strategy training, children who were assigned to the Experience, Elaborated Instruction and Elaborated Instruction Plus Experience conditions received additional training.

Children in the Elaborated Instruction condition were provided with explicit information concerning the utility of the strategy including: 1) instructions concerning when, where, how and why the strategy could be used to aid learning; and 2) the experimenter demonstrated the appropriateness and inappropriateness of the strategy on various mnemonic tasks. In contrast, Experience training consisted of simply exposing children to a variety of mnemonic tasks on which the keyword strategy was appropriate (e.g., surname-profession, countries-food pairs) and inappropriate (e.g., tasks requiring verbatim recall of prose material). The children practiced using the keyword on these tasks, and were informed by the experimenter of the appropriateness of the technique for the particular task. This condition represents, at best, an implicit elaborated instruction condition in that if children gained principles (i.e., knowledge) regarding the strategy's effectiveness (i.e., why, when, where and how it is effective) they had to abstract them for themselves. Children in the Elaborated Instruction Plus Experience condition received both of the training procedures described above.

Following initial instruction in the keyword strategy and additional instruction, depending on the child's assigned experimental condition, all the children completed the maintenance task (i.e., city-product pairs) followed by a generalization task (i.e., Latin noun-English translation pairs). O'Sullivan and Pressley (in press) hypothesized that Elaborated Instruction would be sufficient for strategy generalization. The results indicated that on the several trials of the maintenance task the four experimental groups performed significantly better than the control group. However, there were no significant differences between the performances of the four experimental groups on the maintenance task, therefore any differences on the generalization task could not be attributed to differential learning of the mnemonic strategy.

Performances on the 10 trials of the generalization task supported O'Sullivan and Pressley's (in press) hypothesis. Only children who received elaborated instruction alone or in conjunction with experience training, generalized the strategy successfully. This supports the proposal that elaborated instruction (i.e., Specific Strategy Knowledge) enhances generalization. That elaborated instruction is sufficient for generalization is supported by the fact that there were no differences between the performance of the Elaborated Instruction and Elaborated Instruction Plus Experience groups on the generalization task. Children exposed to experience training alone did not demonstrate generalization of the mnemonic strategy.

Based on O'Sullivan and Pressley's (in press) research it would appear that to promote generalization, training should include a metacognitive knowledge component (i.e., Specific Strategy Knowledge) which: 1) specifies where, why, when and how the strategy can be used; and 2) includes a demonstration of tasks on which the strategy is appropriate and is not appropriate. This metacognitive knowledge component could be easily integrated into the present research paradigm, thereby allowing a test of the potency of an instructional program that includes training in efficient comprehension monitoring strategies (i.e., comparison, monitoring and self-instruction strategies), as well as Specific Strategy Knowledge about the applicability of these strategies to other tasks which require assessing one's level of understanding. Generalization could be assessed on a continuum from near (e.g., implicitly inconsistent versions of the experimental tasks) to moderate (e.g., reading comprehension monitoring task) to far transfer (e.g., message evaluation referential communication task) of training. Given the impressive maintenance effects produced in the present study, and the obvious educational relevance of instructing children in efficient comprehension monitoring, attempting to facilitate generalization of training is the next crucial step in this program of research.

Applications to Learning Disabled Children

Typically, learning disabled children have been characterized as unaware of their cognitive processes and nonstrategic in their approaches to tasks (e.g., Baker, 1982; Hagen, Barclay, & Newman, 1982; Torgensen & Kail, 1980; Wing, 1980). A deficit in basic abilities explanation has generally been dismissed because learning disabled children do profit from instruction (i.e., when the experimenter provides the strategic processing) (e.g., Brown & DeLoache, 1981). Recently, deficits in metacognition has been advanced as a possible explanatory construct for the poor school performances of learning disabled children (e.g., Wong, 1979). The enthusiasm of educators for this approach to understanding and assisting learning disabled children is reflected in a 1982 issue of the educational journal 'Topics in Learning and Learning Disabilities', which was devoted to discussions of the relationship between metacognition and learning disabilities.

As presented in the introduction to this thesis, there is emerging documentation of the deficiencies exhibited by learning disabled children in accurately assessing their level of understanding across the domains of reading, listening and referential communication. To cite a few examples, compared to average children, learning disabled children: do not engage in strategic activities to regulate and retain the main ideas of a passage during reading (Wong, 1979); require explicit probes to notice inconsistencies in reading passages (Bos & Filip, 1979, in Bos & Filip, 1982); are less able to judge when sufficient information has been presented to perform a task (Kotsonis & Patterson, 1980); and are less able to monitor messages for adequacy (Donahue, Pearl, & Bryant, 1980).

Deficiencies in comprehension monitoring skills are obviously related to difficulties in school, and the pervasive finding that learning disabled children show comprehension monitoring deficits reinforces this view. Historically, attempts to enhance the comprehension monitoring performances of learning disabled children have met with failure. In contrast to Markman and Gorin's (1981) findings with average children, Garner and Anderson (1982) found that providing learning disabled children with an appropriate standard of evaluation did not enhance their comprehension performances. Garner and Taylor (1982) reported that even explicitly pointing out the inconsistent sentences did little to facilitate monitoring by learning disabled students.

I would argue that to enhance the listening comprehension monitoring performances of learning disabled children it is crucial to instruct them in the cognitive and metacognitive processes that underlie the efficient application of the standard. The present instructional program has tremendous potential for enhancing the listening comprehension monitoring performances of learning disabled children. In the context of current conceptualizations and approaches to teaching learning disabled children, the present instructional program is timely in that: 1) it is based on a model of metacognition and the interrelationships between cognitive and metacognitive processes in efficient cognizers engaged in cognitive endeavors; 2) the instructional components evolved from an analysis of the processes employed by competent listening comprehension monitors, and an attempt to map these onto the model of metacognition which guided this research; and 3) the increasingly complex processes involved in applying the standard of evaluation were taught to the children in a step by step fashion, with competence in employing one strategy the criterion for instruction in the next strategy. It is interesting to note that this task analytic approach is reminiscent of the approach to teaching learning disabled children advocated by many leading educators (e.g., Lilly, 1979).

In the best of all possible outcomes, the present instructional program would significantly enhance the listening comprehension monitoring performances of learning disabled children, and generalization of training would be facilitated by the inclusion of the metacognitive knowledge component discussed previously. If these proposed outcomes are validated in future studies, the model of metacognition which guided this research, and the instructional operationalization of this model, would have dramatic impact on teaching learning disabled children.

Summary and Conclusions

Listening comprehension monitoring refers to the skills involved in assessing one's level of understanding of orally presented material. Markman (1979) has reported that grade 3 children are inefficient at detecting explicit and implicit consistencies in orally presented expository passages. Markman (1979) attempted to enhance the performances of the grade 3 children by: 1) manipulating the depth of processing required to detect the inconsistencies (i.e., the inconsistent propositions were presented contiguously); and 2) providing the children with a specific instructional set to find inconsistencies, without success.

Subsequent work by Markman and Gorin (1981) has indicated that providing grade 3 children with an appropriate standard for evaluating their comprehension (i.e., providing a criterion for judging when stories are inconsistent) enhances their listening comprehension monitoring performances on inconsistent passages to a moderate degree.

Thus, the limited research conducted to date in the area of listening comprehension monitoring has provided little beyond a demonstration of the deficiencies of young children in yet another cognitive domain. While providing an appropriate standard of evaluation appears to be a relevant component in enhancing the listening comprehension monitoring performances of young children, pressing questions remain unanswered concerning the nature of the cognitive processes involved in the successful application of the standard during listening comprehension monitoring.

The focus of the present research was on designing an instructional program for third grade children to promote the acquisition and maintenance of efficient listening comprehension monitoring performances. The listening comprehension monitoring training package developed for this study was based on theory regarding the nature of metacognition, and extensive pilot research aimed at illuminating the nature of the cognitive processes involved in listening comprehension monitoring. The model of metacognition which guided this research is an extension of the work of Flavell (1979; 1981) and others in this area (e.g., Brown, 1978; Pressley, Borkowski, & O'Sullivan, in press). According to this model of metacognition, three types of strategies are invoked by sophisticated thinkers during cognitive endeavors: 1) basic cognitive strategies as well as knowledge about those strategies (i.e., how, when, where and why the strategies are appropriate); 2) metacognitive strategies to monitor and regulate the implementation of the cognitive strategy or strategies; and 3) high-order coordinating strategies that oversee and integrate the application of the cognitive and metacognitive strategies.

In the specific realm of listening comprehension monitoring, extensive pilot work with adults and children had suggested that the three task-specific analagous strategies involved in detecting inconsistencies in oral passages include: 1) a comparison strategy (i.e., comparing incoming sentences to determine if they are consistent) as the basic cognitive strategy; 2) a monitoring strategy which involves checking back to determine if previously heard information is consistent with just heard information as the metacognitive strategy; and 3) a self- instruction training approach (Meichenbaum & Goodman, 1971) which embodies the functions ascribed to the higher-order coordinating strategies (i.e., coordinating the implementation of the cognitive and metacognitive strategies), and promotes maintenance across time. These higher-order coordinating strategies were operationalized by the inclusion of four self-questions (Meichenbaum & Goodman, 1971) designed to: 1) elicit task-relevant self-statements prior to commencing the task; 2) promote the verbalization of the specific cognitive and metacognitive strategies to be employed prior to commencing the task; 3) evaluate the implementation of the strategies part way through the task; and 4) assess performance at the conclusion of the task, and provide self-reinforcement for an accurate performance. It was hypothesized that grade three children exposed to an appropriate standard of evaluation, in conjunction with this three-tiered instructional package, would demonstrate superior acquisition and maintenance of efficient listening comprehension monitoring performances on the experimental passages relative to children simply provided a standard of evaluation.

The results of the present research led to the following conclusions: 1) in replication of Markman and Gorin's (1981) finding, the provision of an appropriate standard of evaluation enhances the listening comprehension of grade three children relative to uninformed presentation of the passages (i.e., children in the Posttest Only and Story Exposure conditions; 2) providing a standard and exposure to the training passages was no more effective than simple provision of the standard, and may impede performance; and 3) while provision of a standard and training in the comparison and monitoring strategies is sufficient to promote enhanced performance at immediate testing, the inclusion of a self-instruction component facilitated maintenance at delayed testing. Thus, while the provision of an appropriate standard of evaluation constitutes a base for efficient listening comprehension monitoring, the three-tiered instructional package promoted superior performances that were maintained across time.

Additional information gathered during a posttask interview at both immediate and delayed testing provided further support for the superiority of the Comparison + Monitoring + Self-Instruction training condition. While all the children in the training conditions (e.g., Comparison, Comparison + Monitoring, and Comparison + Monitoring + Self-Instruction training groups) employed an equivalent standard of evaluation, significant differences emerged in the nature of the strategy/strategies used in applying this standard to judge the comprehensibility of the passages. This reinforces the initial hypothesis that guided this research--to promote efficient listening comprehension monitoring, young children should be provided with an an appropriate standard of evaluation and instructed in the cognitive processes underlying the application of that standard in monitoring one's comprehension.

Recall data that was collected on the inconsistent passages indicated that the superior performances of the Comparison + Monitoring + Self-Instruction condition cannot be explained as a function of enhanced memory for passage details. These children did not recall more total passage details, but did recall more details relevant to the inconsistency. A reasonable explanation of this finding is that one by-product of the comprehension monitoring training was to increase the saliency of the inconsistent sentences.

While there was some evidence for transfer of training on a 'near' generalization task presented during the posttask interview, evidence for 'far' generalization was nonexistent. However, a recent study by

O'Sullivan and Pressley (1984) provides evidence that increasing the children's metacognitive knowledge concerning the trained strategies promotes transfer of the trained skills. As discussed, this elaborated metacognitive knowledge component can easily be incorporated in the present instructional package, and is the next step in this research program.

In conclusion, research from varied areas of cognitive-developmental inquiry including: listening (e.g., Markman, 1979); memory (e.g., Flavell, Fredrichs & Hoyt, 1970); reading (e.g., Garner & Taylor, 1982); and referential communication (e.g., Flavell, Speer, Green, & August, 1981), provides evidence of the pervasive nature of deficient comprehension monitoring skills in young children and less successful students (e.g., poor readers, retarded children). Comprehension monitoring is an essential academic skill. Students who are unaware of their state of knowing cannot initiate appropriate remedial action. The model of metacognition and the instructional approach which guided the present research produced strong results in facilitating listening comprehension monitoring performances in grade three children. Thus, the present findings have exciting implications for instructing children in efficient comprehension monitoring skills across diverse task domains, and for designing instructional interventions to enhance learning for both average children and children with learning difficulties.

References

Ackerman, B. P. (1981). Young children's understanding of a speaker's intentional use of a false utterance. Developmental Psychology, 17, 472-480.

Ackerman, B. (1982a). Children's use of contextual expectations to detect and resolve comprehension failures. Journal of Experimental Child Psychology, 33, 63-73.

Ackerman, B. P. (1982b). Contextual integration and utterance interpretation: The ability of children and adults to interpret sarcastic utterances. Child Development, 53, 1075-1083.

Asarnow, J. R., & Meichenbaum, D. (1979). Verbal rehearsal and serial recall: The mediational training of kindergarten children. Child Development, 50, 1173-1177.

Asher, S. R. (1976). Children's ability to appraise their own and another person's communication performance. Developmental Psychology, 12, 24-32.

Asher, S. R. (1979). Referential communication. In G. J. Whitehurst & B. J. Zimmerman (Eds.), The functions of language and cognition. New York: Academic Press.

Asher, S. R., & Wigfield, A. (1981(b)). Training referential communication skills. In W. P. Dickson (Ed.), Children's oral communication skills. New York: Academic Press.

Atkin, R., Bray, R., Davison, M., Herberger, S., Humphreys, L., & Selzer, U. (1977). Cross-lagged panel analysis of sixteen cognitive measures at four grade levels. Child Development, 48, 944-952.

Baker, L. (1979). Do I understand or do I not understand: That is the question. (Reading Education Report No. 10). Urbana: University of Illinois, Centre for the Study of Reading, July.

Baker, L. (1982). Comprehension monitoring: Identifying and coping with text confusions. Journal of Reading Behavior, 11, 363-374.

Baker, L. (1982). An evaluation of the role of metacognitive deficits in learning disabilities. Topics of Learning and Learning Disabilities, 3, 27-35.

Baker, L., & Brown, A. L. (In press). Metacognitive skills in reading. In D. Pearson (Ed.), Handbook of reading research.

Beal, C. R., & Flavell, J. H. (1982). The effects of increasing salience of message ambiguity. Developmental Psychology, 18, 43-48.

Belmont, J. M., & Butterfield, E. C. (1977). The instructional approach to developmental cognitive research. In R. Kail & J. Hagen (Eds.), Perspectives on the development of memory and cognition. Hillsdale, New Jersey: Erlbaum.

Belmont, J. M., Butterfield, E. C., & Ferretti, R. P. (1982). To secure transfer of training instruction self-management skills. In D. K. Detterman & R. J. Sternberg (Eds.), How and how much can intelligence be increased? Norwood, N.J.: Ablex Publishing, Corp.

Bender, N. (1976). Self-verbalization versus tutor verbalization in modifying impulsivity. Journal of Educational Psychology, 68, 347-354.

Black, M. M., & Rollins, H. A. (1982). The effects of instructional variables and free recall. Journal of Experimental Child Psychology, 31, 1-19.

Borkowski, J. C. (In press). Signs of intelligence: Strategy generalization and metacognition. In S. Yussen (Ed.), Growth of reflection. Academic Press.

Borkowski, J. G., & Cavanaugh, J. C. (1979). Maintenance and generalization of skills and strategies by the retarded. In N. R. Ellis (Ed.), Handbook of mental deficiency: Psychological theory and research (second edition). Hillsdale, N.J.: Lawrence Erlbaum Associates.

Borkowski, J. G., Levers, S. R., & Gruenenfelder, J. M. (1976). Transfer of mediational strategies in children: The role of activity and awareness during strategy acquisition. Child Development, 47, 779-786.

Bos, C. S., & Filip, D. (1982). Comprehension monitoring skills in learning disabled and average students. Topics in Learning and Learning Disabilities, 3, 79-85.

Brodzinsky, D., Feuer, V., & Owens, J. (1977). Detection of linguistic ambiguity by reflective, implusive, fast/accurate, and slow/inaccurate children. Journal of Educational Psychology, 69, 237-243.

Brown, A. L. (1975). Recognition, reconstruction, and recall of narrative sequences by preoperational children. Child Development, 46, 156-166.

Brown, A. L. (1978). Knowing when, where and how to remember: A problem of metacognition. In R. Glaser (Ed.), Advances in instructional psychology. New Jersey: Lawrence Erlbaum Associates.

Brown, A. L., & DeLoache, J. S. (1978). Skills, plans, and self-regulation. In R. S. Siegler (Ed.), Children's thinking: What develops? Hillsdale, N.J.: Erlbaum Associates.

Burger, a. L., Blackman, L. S., Clark, H. T., & Reis, E. (1982). Effects of hypothesis testing and variable format training on generalization of a verbal abstraction strategy. American Journal of Mental Deficiency, 86, 405-413.

Camp, B., Blom, G., Hebert, F., & Van Doornick, W. (1977). "Think aloud": A program for developing self-control in aggressive boys. Journal of Abnormal Child Development, 5, 157-169.

Campione, J. C., & Brown, A. L. (1978). Toward a theory of intelligence: Contributions from research with retarded children. Intelligence, 2, 279-304.

Campione, J. C., Brown, A. L., & Ferrara, R. A. (1982). Mental retardation and intelligence. In R. J. Sternberg (Ed.), Handbook of human intelligence. Cambridge, England: Cambridge University Press.

Capelli, C. A., & Markman, E. M. (1981). Suggestions for training comprehension monitoring. Unpublished manuscript, Stanford University.

Cavanaugh, J. C., & Borkowski, J. G. (1979). The metamemory-memory "connection": Effects of strategy training and maintenance. Journal of General Psychology, 101, 161-174.

Chi, M. T. H., Glaser, R., & Rees, G. (1982). Expertise in problem solving. In R. J. Sternberg (Ed.), Advances in the psychology of human intelligence. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Cosgrove, J. M., & Patterson, C. J. (1977). Plans and the development of listener skills. Developmental Psychology, 13, 557-564.

Cosgrove, J. M., & Patterson, C. J. (1978). Generalization of training for children's listener skills. Child Development, 49, 513-516.

Dahl, R. (1970). Fantastic Mr. Fox. New York: Alfred A. Knopf, Inc.

DiVesta, F. J., Haywood, K., & Orlando, V. P. (1979). Developmental trends in monitoring text for comprehension. Child Development, 50, 97-105.

Donahue, M., Pearl, R., & Bryan, T. (1980). Learning disabled children's conversational competence: Responses to inadequate messages. Applied Psycholinguistic, 1, 387-403.

Douglas, V., Parry, D., Marton, P., & Garson, C. (1976). Assessment of a cognitive training program for hyperactive children. Journal of Abnormal Child Psychology, 4, 389-410.

Ericsson, K. A., & Simon, H. A. (1980). Verbal reports as data. Psychological Review, 87, 215-251.

Ericsson, K. A., & Simon, H. A. (1984). Protocol analysis: Verbal reports as data. England: The MIT Press.

Faw, H. W., & Waller, T. G. (1976). Mathemagenic behaviors and efficiency in learning from prose material: Review, critique and recommendations. Review of Educational Research, 46, 691-720.

Flavell, J. (1976). Metacognitive aspects of problem solving. In L. Resnick (Ed.), The nature of intelligence. Hillsdale, N.J.: Erlbaum.

Flavell, J. H. (1978). Metacognitive development. In J. M. Scandura & C. J. Brainerd (Eds.), Structural/process models of complex human behaviors. Netherlands: Sijthoff & Neordoff.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. American Psychologist, 34, 906-911.

Flavell, J. H. (1981). Cognitive monitoring. In W. P. Dickson (Ed.), Children's oral communication skills. New York: Academic Press.

Flavell, J. H. (In press). Speculations about the nature and development of metacognition. In R. H. Kluwe & F. G. Weinert (Eds.), Metacognition, motivation and learning.

Flavell, J. H., Friedrichs, A. G., & Hoyt, J. D. (1970). Developmental changes in memorization processes. Cognitive Psychology, 1, 324-340.

Flavell, J. H., Speer, J. R., Green, L. F., & August, D. L. (1981). The development of comprehension monitoring and knowledge about communication. Monographs of the Society for Research in Child Development, 46, (5, Serial No. 192).

Flavell, J. H., & Wellman, H. M. (1977). Metamemory. In R. V. Kail, Jr. & J. W. Hagen (Eds.), Perspectives on the development of memory and cognition. Hillsdale, N.J.: Erlbaum.

Forrest-Pressley, D. L., & Gilles, L. A. (In press). Children's flexible use of strategies during reading. In M. Pressley & J. R. Levin (Eds.), Cognitive strategy training and research. New York: Springer-Verlag.

Garner, R. (1980). Monitoring of understanding: An investigation of good and poor reader's awareness of induced miscomprehension of text. Journal of Reading Behavior, 12, 55-64.

Garner, R. (1981). Monitoring of passage inconsistency among poor comprehenders: A preliminary test of the "piecemeal processing" explanation. Journal of Educational Research, 74, 159-162.

Garner, R., & Anderson, J. (1981). Monitoring of understanding research: Inquiry directions, methodological dilemmas. Journal of Experimental Education, 50, 70-76.

Garner, R., & Reis, P. (1981). Monitoring and resolving comprehension obstacles: An investigation of spontaneous text lookbacks among upper-grade good and poor comprehenders. Reading Research Quarterly, 16, 569-582.

Garner, R., & Taylor, N. (1982). Monitoring of understanding: An investigation of attentional assistance needs at different grade and reading proficiency levels. Reading Psychology, 3, 1-6.

Glenburg, A. M., Wilkinson, A. C., & Epstein, W. (1982). The illusion of knowing: Failure in the self-assessment of comprehension. Memory and Cognition, 10, 597-602.

Glucksberg, S., & Krauss, R. M. (1967). What do people say after they have learned how to talk? Studies of the development of referential communication. Merrill-Palmer Quarterly, 13, 309-316.

Glucksberg, S., Krauss, R. M., & Higgins, E. T. (1975). The development of referential communication skills. In F. D. Horowitz (Ed.), Review of child development research (Vol. 4). Chicago: University of Chicago Press.

Glucksberg, S., Krauss, R. M., & Weisberg, R. (1966). Referential communication in nursery school children: Method and some preliminary findings. Journal of Experimental Child Psychology, 3, 333-342.

Gunning, R. (1952). The technique of clear writing. New York: McGraw-Hill.

Hagen, J. W., Barclay, C. R., & Newman, R. S. (1982). Metacognition, self-knowledge, and learning disabilities: Some thoughts on knowing and doing. Topics in Learning and Learning Disabilities, 3, 19-26.

Holt, J. (1964). How children fail. New York: Merloyd Lawrence.

Johnson, H., & Smith, L. B. (1981). Children's inferential abilities in the context of reading to understand. Child Development, 52, 1216-1223.

Katsonis, M. G., & Patterson, C. J. (1980). Comprehension-monitoring skills in learning disabled children. Developmental Psychology, 16, 541-542.

Kendall, P. C., & Finch, A. J. (1979). Developing nonimpulsive behavior in children: Cognitive-behavioral strategies for self-control. In P. C. Kendall & S. D. Hollon (Eds.), Cognitive-behavioral interventions: Theory, research and procedures. New York: Academic Press.

Kendall, P. C., & Wilcox, L. (1980). Cognitive-behavioural treatment for impulsivity: Concrete versus conceptual training for nonself-controlled problem children. Journal of Consulting and Clinical Psychology, 48, 80-91.

Kennedy, B. A. , & Miller, D. J. (1976). Persistent use of verbal rehearsal as a function of information about its value. Child Development, 47, 566-569.

Kirk, R. E. (1968). Experimental design: Procedures for the behavioral sciences. California: Brooks/Cole.

Kleiman, G. M., & Schallert, D. L. (1978). Some things the reader needs to know that the listener doesn't. In D. Pearson & J. Hansen (Eds.), 27th Yearbook of the National Reading Conference. Clemson, S.C.: NRC.

Kooney, S. T., & Murphy, M. D. (1983). Message plausibility and children's ability to monitor their own comprehension. Paper presented at the meeting of the Society for Research in Child Development, Detroit, Michigan, April.

Landry, D. L. (1979). The neglect of listening. Elementary English, 46, 599-605.

Lawson, M. J., & Fuelop, S. (1980). Understanding the purpose of strategy training. British Journal of Educational Psychology, 50, 175-180.

Lepper, M. R., & Greene, D. (1978). The hidden costs of rewards. New York: Lawrence Erlbaum Associates.

Lilly, M. S. (1979). Children with exceptional needs: A survey of special education. New York: Holt, Rinehart & Winston.

Lundsteen, S. W. (1979). Listening: Its impact on reading and other language arts. Urbana, Illinois: National Council of Teachers of English.

Marascuilo, L. A., & McSweeney, M. (1977). Nonparametric and distribution-free methods for the social sciences. California: Brooks/Cole.

Markman, E. M. (1977). Realizing that you don't understand: A preliminary investigation. Child Development, 48, 986-992.

Markman, E. M. (1979). Realizing that you don't understand: Elementary school children's awareness of inconsistencies. Child Development, 50, 643-655.

Markman, E. M. (1981). Comprehension monitoring. In W. P. Dickson (Ed.), Children's oral communication skills. New York: Academic Press.

Markman, E. M., & Gorin, L. (1981). Children's ability to adjust their standards for evaluating comprehension. Journal of Educational Psychology, 73, 320-325.

Meichenbaum, D., & Asarnow, J. (1979). Cognitive-behavioral modification and metacognitive development: Implications for the classroom. In P. Kendall & S. Hollon (Eds.), Cognitive behavioral interventions: Theory, research and procedures. New York: Academic Press.

Meichenbaum, D. H., & Goodman, J. (1971). Training impulsive children to talk to themselves: A means of developing self-control. Journal of Abnormal Psychology, 77, 115-126.

Messer, S. (1976). Reflection-impulsivity: A review. Psychological Bulletin, 83, 1026-1052.

Miller, G. E. (1982). The effects of self-instructions and didactic training on fifth graders' detection of errors in prose passages. Unpublished dissertation, University of Wisconsin.

Miller. G. E. (1984). The effects of general and specific self-instruction training on young children's comprehension monitoring performances during reading. Paper presented at the meeting of the American Education Research Association, New Orleans, Louisiana, April, 1984.

O'Sullivan, J. T., & Pressley, M. (In Press). Completeness of instruction and strategy transfer. Journal of Experimental Child Psychology.

Owings, R. A., Peterson, G. A., Brandsford, J. D., Morris, C. D., & Stein, B. S. (1980). Spontaneous monitoring and regulation of learning: A comparison of successful and less successful fifth graders. Journal of Educational Psychology, 72, 250-256.

Paris, S. G., & Meyers, M. (1981). Comprehension monitoring, memory and study strategies of good and poor readers. Journal of Reading Behavior, 13, 7-22.

Patterson, C. J., & Kister, M. C. (1981). The development of listener skills for referential communication. In W. P. Dickson (Ed.), Children's oral communication skills. New York: Academic Press,

Patterson, C. J., Massad, C. M., & Cosgrove, J. M. (1978). Children's referential communication: Components of plans for effective listening. Developmental Psychology, 14, 401-406.

Patterson, C. J., O'Brien, C., Kister, M. C., Carter, D. B., & Kotsonis, M. E. (1981). Development of comprehension monitoring as a function of context. Developmental Psychology, 17, 379-389.

Piaget, J. (1926). The language and thought of the child. New York: Harcourt Brace.

Pratt, M. W., & Bates, K. R. (1982). Young editors: Preschooler's evaluation and production of ambiguous messages. Developmental Psychology, 18, 30-42.

Pratt, M. W., & Wickens, G. (1983). Checking it out: Cognitive style, context and problem type in children's monitoring of text comprehension. Journal of Educational Psychology, 75, 716-726.

Pressley, M. (1979). Increasing children's self-control through cognitive interventions. Review of Educational Research, 49, 319-370.

Pressley, M., Borkowski, J. G., & O'Sullivan, J. (In Press, a). Memory strategies are made of this: Metamemory and durable strategy use. Educational Psychologist.

Pressley, M., Borkowski, J. G., & O'Sullivan, J. T. (In Press, b). Metamemory and the teaching of strategies. In D. L. Forrest-Pressley, G. E. MacKinnon, & T. G. Waller (Eds.), Metacognition, cognition, and human performance. San Diego: Academic Press.

Pressley, M., & Mulaly, J. (1984). Alternative research paradigms in the analysis of mnemonics. Contemporary Educational Psychology, 9, 48-60.

Revelle, G. L., Karabenick, J. D., & Wellman, H. M. (1981). Comprehension monitoring in preschool children. Paper presented at the meeting of the Society for Research in Child Development, Boston, April.

Ringel, B. A., & Springer, C. J. (1980). On knowing how well one is remembering: The persistence of strategy use during transfer. Journal of Experimental Child Psychology, 29, 322-333.

Rosenberg, S., & Cohen, B. D. (1966). Referential processes of speakers and listeners. Psychological Review, 73, 208-231.

Royer, J. M. (1979). Theories of transfer of learning. Educational Psychologist, 14, 53-69.

Ryan, M. P. (1984). Monitoring text comprehension: Individual differences in epistemological standards. Journal of Educational Psychology, 76, 248-258.

Schleser, R., Meyers, W. S., & Cohen, R. (1981). Generalization of self-instructions: Effects of general versus specific content, active rehearsal and cognitive level. Child Development, 52, 335-340.

Schneider, W. (In Press). Developmental trends in the metamemory-memory relationship: An integrative review. In D. L. Forrest-Pressley, G. E. MacKinnon, & T. G. Waller (Eds.), Metacognition, cognition and human performance. New York: Academic Press.

Singer, J. B., & Flavell, J. H. (1981). Development of knowledge about communication: Children's evaluations of explicitly ambiguous messages. Child Development, 52, 1211-1215.

Stein, N. L., & Trabasso, T. (1982). What's in a story: Critical issues in comprehension and instruction. In R. Glaser (Ed.), Advances in the psychology of instruction (Vol. 2). Hillsdale, N.J.: Lawrence Erlbaum Associates.

Tikhomirov, O. K., & Klochko, V. E. (1981). The detection of a contradiction as the initial stage of problem formation. In J. V. Wertsch (Ed.), The concept of activity in soviet psychology. New York: M.E. Sharpe Inc.

Tompkins, G. E., Friend, M., & Smith, P. L. (1984). Children metacognitive knowledge of listening. Paper presented at the meeting of the American Research Association, New Orleans, Louisiana, April.

Torgesen, J. K., & Kail, R. V. (1980). Memory processes in exceptional children. In B. Koegh (Ed.), Advances in special education, Vol. 1. Greenwich, Conn.: JAI Press.

Tunmer, W. E., Nesdale, A. R., & Pratt, C. (1983). The development of young children's awareness of logical inconsistencies. Journal of Experimental Child Psychology, 36, 97-108.

Torgesen, J. K. (1977). The role of nonspecific factors in the task performance of learning disabled children: A theoretical assessment. Journal of Learning Disabilities, 10, 27-34.

Winograd, P., & Johnston, P. (1982). Comprehension monitoring and the error detection paradigm. Journal of Reading Behavior, 14, 61-76.

Weber, R. M. (1970). A linguistic analysis of first-grade reading errors. Reading Research Quarterly, 5, 427-451.

Wilt, M. E. (1950). A study of teacher awareness of listening as a factor in elementary education. Journal of Educational Research, 43, 626-636.

Wong, B. Y. L. (1979). The role of theory in learning disabilities research: Part II. A selective review of current theories of learning and reading disabilities. Journal of Learning Disabilities, 12(10), 15-24.

Wong, B. Y. L. (1979). Increasing retention of main ideas through questioning strategies. Learning Disabilities Quarterly, 2, 42-47.

Wong, B. Y. L. (1980). Activating the inactive learner: Use of questions/prompts to enhance comprehension and retention of implied information in learning disabled children. Learning Disabilities Quarterly, 3, 29-37.

Yussen, S. R., Mathews, S. R., & Hiebert, E. (1981). Metacognitive aspects of reading. In W. Otto & S. White (Eds.), Reading expository text. New York: Academic Press.

APPENDIX A

Passages Used in Adult Pilot Study

SNAKES (Explicitly Inconsistent)

There are many different kinds of snakes. Some snakes are eight feet long and very fat. Some snakes are only six inches long and very skinny. Some snakes have a poisonous bite, but some snakes are harmless and even help us. The garden snake, for example, helps us by keeping bad insects away from our gardens. Garden snakes eat these insects. They find the insects by listening for them. The insects make a special noise. Garden snakes do not have ears. [They cannot hear the insects. They can hear the sounds of the insects. That is how they are always able to find the insects.]

Implicitly Inconsistent Version

The following sentences are substituted for the bracketed sentences above:

> They always catch plenty of insects.
> That is how they are able to help us keep our gardens free of insects.

ANTS (Explicitly Inconsistent)

There are some things that almost all ants have in common. For example, they are all amazingly strong and can carry objects many times their own weight. Sometimes they go very, very far from their nest to find food. They go so far they cannot remember how to go home. So to help them find their way home, ants have a special way of leaving an invisible trail. [Everywhere they go they put out a special chemical from their bodies. They cannot see this chemical, but it has a special odor. An ant must have a nose in order to smell this chemical odor. Another thing about ants is that they do not have a nose. Ants cannot smell this odor. Ants can always find their way home by smelling for this odor to follow the trail.]

Implicitly Inconsistent Version

The following sentences are substituted for the bracketed sentences above:

> Everywhere they go they put out an invisible chemical from their bodies. The chemical has a special odor.
> Another thing about ants is they do not have a nose.
> Ants never get lost.

PIGEONS (Explicitly Inconsistent)

Homing pigeons are birds that are able to find their way home even if they are hundreds of miles away. Some people use homing pigeons to carry messages over long distances. They fasten messages to the pigeon's legs. Homing pigeons can even find their way home at night. They find their way home by seeing the position of the stars in the sky. Some people have tried blindfolding the homing pigeons by putting little black masks over their eyes. The blindfolded pigeons could not use their eyes. [Blindfolded pigeons could not see the light. Blindfolded pigeons could see the light of the stars. That is how they were all able to find their way home.]

<u>Implicitly Inconsistent Version</u>

The following sentences are substituted for the bracketed sentences above:

> They were able to use the stars to find their way home. All of the pigeons were able to find their way home.

FISH (Explicitly Consistent)

Many different kinds of fish live in the ocean. Some fish have heads that make them look like alligators, and some fish have heads that make them look like cats. Fish live in different parts of the ocean. Some fish live near the surface of the water, but some fish live way down at the bottom of the ocean. [Fish must have light in order to see. There is absolutely no light at the bottom of the ocean. It is pitch black down there. When it is that dark the fish cannot see anything. They cannot even see colors. Some fish that live at the bottom of the ocean can smell their food; that is how they know what to eat.]

<u>Implicitly Consistent Version</u>

The following sentences are substituted for the bracketed sentences above:

> There is absolutely no light at the bottom of the ocean. Some fish that live at the bottom of the ocean know their food by its smell. They will only eat red fungus.

APPENDIX B

Passages Used in Children's Pilot Study

TURTLES (Consistent)

There are many different kinds of turtles, some are very big others are tiny. / Turtles can be found all over the world wherever the weather is warm for at least part of the year. / Some turtles live in the water and other turtles live on land. / Turtles do not like the cold. If a turtle gets very cold it will die. / Turtles must keep warm in the winter. To keep warm turtles bury themselves at the bottom of a pond or burrow a hole in the ground. / They sleep in these warm places for the whole winter. On winter days you will never see a turtle swimming in the icy water for hours or walking along snowbanks. /

Note: Slash marks indicate parsing used to insert the 10 second pauses.

GIRAFFES (Explicitly Inconsistent)

The tallest of all living animals is the giraffe. / A giraffe may grow to be 16 to 20 feet tall. That is as tall as a streetlight. The giraffe has a very long neck. / Giraffes have thick skin which is covered with short hair. The giraffe is yellow and brown spotted. / Giraffes live in Africa. Some parts of Africa have grass and trees. Some parts of Africa are desert and there is only sand. / The only food a giraffe eats are the leaves off the tops of trees. They reach the leaves easily with their long necks. / Giraffes can only be found where there are lots of trees. Giraffes can live in the desert where there is only sand and no trees, and they always have plenty of leaves to eat. /

Note: Slash marks indicate the parsing used to insert the 10 second pauses.

FISH (Explicitly Inconsistent)

Many different kinds of fish live in the ocean. / Some fish have heads that make them look like alligators, and some fish have heads that make them look like cats. / Fish live in different parts of the ocean. Some fish live near the surface of the water, but some fish live way down at the bottom of the ocean. / Fish must have light in order to see. There is absolutely no light at the bottom of the ocean. / It is pitch black down there. When it is that dark the fish cannot see anything. / They cannot even see colors. Some fish that live at the bottom of the ocean can see the color of their food; that is how they know what to eat. /

Note: Slash marks indicate the parsing used to insert the 10 second pauses.

PIGEONS (Explicitly Inconsistent)

Homing pigeons are birds that are able to find their way home even if they are hundreds of miles away. / Sometimes people use homing pigeons to carry messages over long distances. They fasten messages to the pigeon's legs. / Homing pigeons can even find their way home at night. They find their way home by seeing the position of the stars in the sky. / Some people have tried blindfolding the homing pigeons by putting little black masks over their eyes. / The blindfolded pigeons could not use their eyes. / Blindfolded pigeons could not see light. The blindfolded pigeons could see the light of the stars. / That is how they were all able to find their way home. /

Note: Slash marks indicate the parsing used to insert the 10 second pauses.

ANTS (Consistent)

There are some things that almost all ants have in common. For example, they are all amazingly strong and can carry objects many times their own weight. / Sometimes they go very, very far from their nest to find food. They go so far away that they cannot remember how to go home. / So to help them find their way home, ants have a special way of leaving an invisible trail. Everywhere they go they put out a special chemical from their bodies. / They cannot see this chemical, but it has a special odor. An ant must smell this odor. / Another thing about ants is that they do not have a nose. Ants smell through the little hairs on their heads. / Ants can smell this odor. Ants can always find their way home by smelling for this odor to follow the trail. /

Note: Slash marks indicate the parsing used to insert the 10 second pauses.

APPENDIX C

Passage Validation Measures for the Passages

Used in the Main Study

Given that the study was to include both an extensive training phase and measures of maintenance, a number of passages were required. Initially 24 nature passages were written for the study. The stories were written at a grade 3 reading level (Gunning, 1968). Nature stories, specifically animal facts and habits, were chosen for the experimental passages because the basic intent of the research was to create a school-like situation in which the children monitor their understanding of new, factual material that is orally presented. In addition, the choice of science stories represents an attempt to remove any element of fantasy from the children's perceptions of the stories. Many of the stories that eight year old children read, or are exposed to, contain a large fantasy element which requires the child to temporarily suspend his/her disbelief. Therefore, it was imperative that the experimental passages be presented to the children as reality-based and factual.

The content of the stories was derived from nature and science books that were written for elementary school children. All stories were written according to a particular format such that by deleting or substituting sentences explicitly inconsistent, and consistent versions of each passage could be generated. Table C-1 presents an example of an explicitly inconsistent experimental passage and the manipulation used to create a consistent version of the passage. This feature of manipulating passage content to generate various versions of the stories was employed to avoid a passage confound in the present research (i.e., passage topic and passage version were randomized across subjects).

The selection of a subset of 13 stories from this initial pool of 24 was based on stringent selection criteria that involved pilot work

Table C-1

Example of Explicitly Inconsistent Passage and Manipulation Used to Create a Consistent Version of the Passage

GORILLAS

Explicitly Inconsistent Version

1a. Gorillas are big hairy animals that live in the jungle.
1b. Gorillas are very strong animals.

2a. Gorillas live together in small families.
2b. There is a mother, father and baby gorilla.

3a. During the day gorillas travel from place to place looking for food.
3b. At night gorillas look for a tree to sleep in.

4a. The mother gorilla and baby gorilla sleep in the tree.
4b. Father gorilla sleeps at the bottom of the tree.

5a. Each night gorillas must look for a new tree to sleep in.
5b. Gorillas look at many trees before picking one to sleep in.

6a. Gorillas do not sleep in the same tree every night.
6b. Gorillas always return to the same tree to sleep every night.

7a. That is where gorillas sleep at night.
7b. That's the story about gorillas.

Consistent Version

- sentence 6b. is deleted and the following sentence is substituted: Gorillas never sleep in the same tree twice.

of stories, as well as how these criteria were operationalized and tested, are outlined below:

(1) grade three children should be familiar with the appearance of the animal that is the topic of the passage. One class of grade three children (n = 26) was administered a multiple-choice test in which they were required to select a picture of each passage-topic animal from four possible referents. A criterion of 100% recognition was employed for this measure.

(2) grade three children should not know the correct information to resolve the inconsistently. For example, for the passage presented in Table C-1 grade three children should not know that gorillas travel quite a bit and consequently sleep in a different tree each night. If grade three children already knew that gorillas sleep in a different tree each night, the detection of the inconsistency is reduced to matching the sentence "Gorillas always return to the same tree to sleep every night" with their prior knowledge, which is an easier task (cf., Baker, 1982, in Miller, 1982), rather than monitoring their comprehension of the passage. One class of grade three children (n = 26) was administered a multiple choice test regarding the animal facts that formed the inconsistencies in the passages. For the 'Gorillas' passage the multiple choice question was: "For each night gorillas:

a) sleep in the same tree

b) sleep in a different tree

c) sleep in a cave

d) sleep on the ground

Another class of grade three children (n = 25) was administered a test in which they had to indicate whether a particular animal fact was true or false (again the question centered around the information contained in the inconsistency). For the 'Gorillas' passage, the children were asked to indicate whether the following sentence was true or false: "Gorillas sleep in a different tree every night." For these measures the criterion that was used to select passages was that less than 56% of the children had to answer the multiple choice or true-false question correctly for any passage to be included.

(3) grade three children should be able to read the passage with no difficulty. The assumption here was that if children could read the passage without difficulty, there should be no problems with listening to the passage. From one grade three class two poor, two average and two superior readers (as indicated by teacher nominations) were required to read aloud randomly selected set of 12 passages (the explicitly inconsistent versions of the passages were read by all 6 subjects). The top and average readers were able to read all the passages independently. One of the poor readers required minimal assistance in reading the passages (i.e., phonetic guidance with three words). The poorest reader required assistance with 23 words in the 12 passages that she read. However, she was able to read the words when the experimenter assisted her in decoding the words phonetically. This reader was able to adequately define the words that she had

difficulty reading, indicating she understood their meanings. The performances of these six children supported the results of the readability formula (Gunning, 1968) which indicated that the passages are written at approximately a grade three level. The criteria for selecting passages was that they should be readable by the average grade three reader, therefore, all the stories met this criterion.

(4) five adults (all had advanced graduate training in developmental and/or applied psychology) rated the stories to provide external validation that the stories conformed to the format employed by the experimenter in developing the passages. The adults were required to answer yes or no to the following questions concerning each of the 24 passages (the explicitly inconsistent versions of each passage were rated by the adults):

a) Do sentences 1a and 3b, inclusive, present information that is necessary to detect the inconsistency?

b) Are sentences 6a and 6b explicitly inconsistent?

c) If the following sentence [a sentence was provided for each passage - for the sentence was "Gorillas never sleep in the same tree twice"] is used to replace sentence 6b is the passage still inconsistent?

Passages were selected in which the pattern of the adults response was no, yes, no to these questions indicating that the stories conform to the original format as detailed below:

a) the initial part to the passage (1a to 3b inclusive) is irrelevant to the inconsistency

b) the inconsistency in the story is located in sentences 6a and 6b

c) by substituting a new sentence for sentence 6b the passage can be made consistent.

Thirteen of the initial 24 stories met all of the above criteria, and were used as the passages in the present research. Table C-2 presents a list of thirteen stories that were used in the research, as well as a word count, the average sentence length, and the grade reading level for each passage. The thirteen passages are reproduced in Appendix D.

Table C-2

Word Counts, Average Sentence Length, and Readability Levels of the Experimental Passages

Passage Title	Number of Words	Average Words Per Sentence	Readability Grade Level[a]
1. Fish	115	8.9	3.5
2. Giraffes	117	9.0	3.6
3. Pigeons	115	8.9	3.5
4. Racoons	113	8.7	3.5
5. Owls	107	8.2	3.3
6. Sea Horses	118	9.1	3.6
7. Chipmunks	115	8.9	3.5
8. Alligators	121	9.3	3.7
9. Elephants	117	9.0	3.6
10. Camels	119	9.2	3.7
11. Skunks	101	7.8	3.1
12. Swans	104	8.0	3.2
13. Gorillas	121	9.3	3.7

[A]According to Gunning's (1968) readability formula.

APPENDIX D

Passages Used in the Main Study

SEA HORSES

1a. The sea horse is a fascinating fish.

1b. Sea horses are found in oceans and seas.

2a. Sea horses are very small.

2b. Sea horses grow to be twelve centimeters long.

3a. The sea horse's head looks like a tiny horse's head.

3b. The sea horse has a small body and a long tail.

4a. When the sea horse swims it looks like it is standing on its tail.

4b. It moves through the water by moving fins on its head and back.

5a. The sea horse is not a very fast swimmer.

5b. It makes jerky movements as it swims.

6a. The sea horse moves slowly through the water.

6b. The sea horse escapes enemy fish by quickly swimming away.

7a. That is how the sea horse keeps from being eaten by other fish.

7b. That's the story about sea horses.

CONSISTENT

6b. The sea horse escapes enemy fish by hiding in the seaweed.

GIRAFFES

1a. Giraffes live in Africa.

1b. The giraffe is the tallest of all land animals.

2a. A giraffe may grow to be as tall as a streetlight.

2b. The giraffe has a very long neck.

3a. Giraffes have thick skin which is covered with short hair.

3b. The giraffe is yellow and brown spotted.

4a. Some parts of Africa have trees and grass.

4b. Other parts of Africa are desert and there is only sand.

5a. The only food a giraffe eats are leaves.

5b. Giraffes will not eat anything but leaves.

6a. Giraffes can only be found where there are lots of leaves.

6b. Giraffes live in the desert parts of Africa where there is only sand.

7a. That is how giraffes always have plenty of leaves to eat.

7b. That's the story about giraffes.

CONSISTENT

6b. Giraffes live in the parts of Africa that have trees and always have lots of leaves to eat.

OWLS

1a. Owls are big beautiful birds.

1b. Owls live in trees or barns.

2a. Owls have very good eyesight.

2b. Owls can see mice easily from their nests high up in the trees.

3a. Owls are excellent hunters.

3b. They fly down from the trees and catch mice and other small animals.

4a. The owl's body is covered with long soft feathers.

4b. The feathers are grey or brown.

5a. The owl's feathers are made to keep him warm in the cold winter weather.

5b. The owl does not mind the winter weather.

6a. The owl's feathers keep him warm even during snowstorms.

6b. When the weather turns cold the owl flies south to a warmer place.

7a. That is how the owl spends the winter.

7b. That's the story about owls.

CONSISTENT

6b. When the weather turns cold the owl does not fly south to a warmer place.

CHIPMUNKS

1a. Chipmunks are about twenty-two centimeters long.

1b. Chipmunks are small but they move very quickly.

2a. Chipmunks have a brown head, and grey and black stripes on their backs.

2b. They also have a yellow stripe on each side of their bodies.

3a. Chipmunks live in holes under the ground.

3b. Chipmunks gather nuts and keep them in their holes.

4a. Chipmunks stay inside their holes all winter.

4b. Chipmunks never leave their holes in the cold weather.

5a. Chipmunks do not sleep the whole winter.

5b. Chipmunks wake up whenever they are hungry.

6a. Chipmunks spend the winter eating and sleeping in their holes.

6b. Chipmunks sleep through the whole winter and never wake up.

7a. That is what the chipmunks do all winter.

7b. That's the story about chipmunks.

CONSISTENT

6a. Chipmunks do not sleep through the whole winter because they wake up to eat.

SKUNKS

1a. Skunks live in the forest.

1b. Skunks are black with a white stripe down their back.

2a. Skunks are small animals.

2b. Skunks have a special way of protecting themselves.

3a. Under their tails skunks have little sacks that let out a terrible smell.

3b. When a skunk sees an enemy he lets out this smell.

4a. The smell scares the enemy away.

4b. People have these sacks taken off and keep skunks for pets.

5a. Skunks make excellent pets.

5b. Skunks can be tamed like cats.

6a. Skunks are friendly animals.

6b. People never have skunks for pets because they are mean and bite.

7a. That is the kind of pet a skunk makes.

7b. That's the story about skunks.

CONSISTENT

6b. Skunks are not mean and do not bite.

FISH

1a. Many fish live in the ocean.

1b. There are many kinds of fish in the ocean.

2a. There are many different sizes of fish.

2b. Some are very big and others are tiny.

3a. Some fish live near the surface of the water.

3b. Other fish live way down at the bottom.

4a. Fish must have light to see.

4b. There is no light at the bottom of the ocean.

5a. It is pitch black down there.

5b. When it is that dark the fish cannot see anything.

6a. They cannot even see colours.

6b. Fish that live at the bottom of the ocean can see the colour of their food.

7a. That is how fish at the bottom of the ocean find their food.

7b. That's the story about fish.

CONSISTENT

6b. Fish that live at the bottom of the ocean smell their food.

PIGEONS

1a. Homing pigeons are a special kind of pigeon.

1b. Homing pigeons can always find their way home from far away.

2a. People use homing pigeons to carry messages.

2b. They tie the message around the pigeon's leg.

3a. Homing pigeons can even find their way home at night.

3b. They find their way home by seeing the position of the stars in the sky.

4a. People have tried blindfolding the homing pigeons.

4b. They put little black masks over the homing pigeon's eyes.

5a. The blindfolded pigeons could not see anything.

5b. The blindfolded pigeons could not use their eyes.

6a. The blindfolded pigeons could not see light.

6b. The blindfolded pigeons found their way home by the stars.

7a. That is how the blindfolded pigeons found their way home.

7b. That's the story about pigeons.

CONSISTENT

6b. The blindfolded pigeons found their way home by smelling the way.

ALLIGATORS

1a. Alligators can be found in warm parts of the world.

1b. Mother alligators take good care of their babies.

2a. Mother alligators make nests out of twigs and grass.

2b. They build their nests on dry ground.

3a. Mother alligators lay their eggs in the nests.

3b. Two months later the baby alligators are hatched.

4a. Baby alligators are only twenty centimeters long and need to be protected.

4b. When danger is near the mother alligator makes a grunting noise.

5a. The baby alligators swim to the bottom of the pond and hide.

5b. Baby alligators swim quickly to the hiding spot.

6a. Baby alligators can swim as soon as they are hatched.

6b. Alligators cannot swim until they are full grown.

7a. That is how the mother alligator protects her babies.

7b. That's the story about alligators.

CONSISTENT

6b. When alligators are full grown they do not hide, they fight their enemies.

ELEPHANTS

1a. The elephant is the largest of all land animals.

1b. Elephants live in hot countries.

2a. Lady elephants are called cow elephants.

2b. Men elephants are called bull elephants.

3a. Elephants eat leaves and fruit and drink lots of water.

3b. Elephants are always on the move looking for food and water.

4a. Elephants travel from place to place in herds.

4b. There are about thirty elephants in a herd.

5a. A cow elephant is always the leader of the herd.

5b. The cow elephant is a very careful leader.

6a. The cow elephant leads the herd safely to a new feeding place.

6b. When elephants travel they all follow the bull elephant.

7a. That is who leads the elephant herd.

7b. That's the story about elephants.

CONSISTENT

6b. When elephants travel they all follow the cow elephant.

CAMELS

1a. Camels live in the desert of Africa.

1b. There is little food and water in the desert.

2a. People who live in the desert have tamed the camels.

2b. They use camels to carry their things when they travel.

3a. The desert people make many trips across the desert looking for food and water.

3b. These trips take many days.

4a. Camels have large humps on their backs.

4b. This hump is used to store extra food.

5a. Camels can go many days without being fed.

5b. When there is no food to eat the camels use the food in their humps.

6a. Camels can cross the desert without being fed.

6b. Camels must be given food every day.

7a. That is why the desert people use the camels when they travel.

7b. That's the story about camels.

CONSISTENT

6b. Camels do not have to be given food every day.

RACOONS

1a. Racoons live in the forest.

1b. Racoons are about the size of a cat.

2a. Racoons are covered with thick fur.

2b. Their fur is grey and black striped.

3a. The black stripe across the racoon's face makes him look like he's wearing a mask.

3b. The racoon has a long bushy tail.

4a. Racoons have sharp claws that they use when they look for food.

4b. Racoons spend many hours each day looking for food.

5a. Racoons are not picky eaters and will eat almost anything.

5b. Racoons eat any food they find like berries and insects.

6a. Racoons even go through garbage cans to find things to eat.

6b. The only food racoons eat is fish that they catch from the river.

7a. That is the kind of food a racoon will eat.

7b. That's the story about racoons.

CONSISTENT

6b. Racoons also eat fish that they catch from the river.

SWANS

1a. Swans are big white birds.

1b. Swans have very long necks.

2a. Swans toes are joined by skin called webs.

2b. Swans webbed toes help them swim quickly.

3a. Swans have large strong wings that are good for flying.

3b. Swans fly gracefully through the air.

4a. When the weather turns cold swans fly south.

4b. The swans fly south to warmer places.

5a. Every year the swans follow the same path when they fly south.

5b. The swans follow each other along the path south.

6a. Swans always take this one path south.

6b. Every year the swans take a different path south.

7a. That is how swans fly south when the weather turns cold.

7b. That's the story about swans.

CONSISTENT

6b. Swans never take another path when they fly south.

GORILLAS

1a. Gorillas are big hairy animals that live in the jungle.

1b. Gorillas are very strong animals.

2a. Gorillas live together in small families.

2b. There is a mother, father and baby gorilla in a family.

3a. During the day gorillas travel from place to place looking for food.

3b. At night gorillas look for a tree to sleep in.

4a. The mother and baby gorilla sleep in the tree.

4b. Father gorilla sleeps at the bottom of the tree.

5a. Each night the gorillas must look for a new tree to sleep in.

5b. Gorillas look at many trees before picking one to sleep in.

6a. Gorillas do not sleep in the same tree every night.

6b. Gorillas always return to the same tree to sleep every night.

7a. That is where the gorillas sleep at night.

7b. That's the story about gorillas.

CONSISTENT

6b. Gorillas never sleep in the same tree twice.

APPENDIX E

Elaborations of Scoring Criteria for Inconsistencies Detected, Quality of Inconsistency Judgments, Memory for Inconsistent Passage, and Strategy Use Measures

Table E-1

Criteria Used to Assess Inconsistencies Detected and Quality of Inconsistency Judgments for Inconsistent Versions of the Maintenance Passages

FISH

5a. It is pitch black (dark, no light) down there (at the bottom).
5b. When it is that dark the fish cannot see anything.

6a. They cannot even see colors.
6b. Fish that live at the bottom of the ocean an see the color of their food.

PIGEONS

5a. The blindfolded pigeons could not see anything.
5b. The blindfolded pigeons could not use their eyes.

6a. The blindfolded pigeons could not see light (stars).
6b. The blindfolded pigeons found their way home by stars (light).

ALLIGATORS

5a. The baby alligators/swim to the bottom of the pond and hide/hide at the bottom of the pond/
5b. Baby alligators swim quickly to the hiding spot (place).

6a. Baby alligators swim as soon as they are hatched (born).
6b. Alligators cannot swim/until they are full grown/when they are first born/

ELEPHANTS

5a. A cow elephant is always the leader (leads) the herd.
5b. The cow elephant is a very careful (safe) leader.

6a. The cow elephant leads the herd safely to a new feeding place.
6b. When elephants travel they all/follow the bull elephant/the bull elephant leads the herd/

SWANS

5a. Every year the swans follow the same path when they fly south.
5b. The swans follow each other along the path south.

6a. Swans always take this one path south.
6b. Every year the swans take a different path south.

CAMELS

5a. Camels can go many days (a long ways, a long time) without being fed (without food).

5b. When there is no food to eat camels use the food in their humps.

6a. Camels can cross the desert/without being fed/without food/

6b. Camels must be/given food/fed/every day.

RACOONS

5a. Racoons are/not picky eaters/and /will eat almost anything/ [either phrase]

5b. Racoons eat/any food they find/like /berries and insects/ [either phrase]

6a. Racoons even go through garbage cans to find food to eat.

6b. The only food racoons eat is fish that they catch from the river.

GORILLAS

5a. Each/night gorillas must look (find, pick) for a new (different, another) tree to sleep in/gorillas change trees every night/

5b. Gorillas look at many trees before picking one to sleep in.

6a. Gorillas/do not sleep in the same tree every night/sleep in different trees at night/go tree to tree at night/

6b. Gorillas always/return to the same tree to sleep every night/ go back to the same tree at night/

_________ = Key information scored in children's responses.

(   ) = Alternative acceptable wording to previous word.

/   / = Alternative acceptable phrase to previous phrase enclosed phrase enclosed in slash marks.

Table E-2

Idea Units Scored for in the Children's Recall of the 'Elephants' - Inconsistent Passage

'ELEPHANTS' - Inconsistent

1a. The elephant is the largest (biggest) of all land animals.
1b. Elephants live in hot countries (warm places).

2a. Lady (girl, mother) elephants are called cow elephants.
2b. Men (boy, father) elephants are called bull elephants.

3a. 1. Elephants eat leaves
2. and fruit (bananas, berries)
3. and drink lots of water.
3b. 1. Elephants are always on the move looking (to find, hunting) for food (feeding places)
2. /and water/ on the move looking for water/

4a. Elephants travel (go, hunt) from place to place in herds (groups, bunches, tribes).
4b. There are thirty elephants in a herd (group, bunch, tribe).

5a. The/cow elephant is always the leader (leads) of the herd/they follow the cow elephant/.
5b. The cow elephant is a very careful (safe, good) leader.

6a. The cow elephant leads (takes) the herd safely to a new feeding place.
6b. When/elephants travel they all follow the bull elephant/the bull elephant is the leader/

7a. That is who leads the elephant herd.
7b. That's the story about elephants.

_____ = Key information scored in children's recall.

( ) = Alternative acceptable wording to previous word.

/ / = Alternative acceptable phrase to previous phrase enclosed in slash marks.

Table E-3

Idea Units Scored for in the Children's Recall of the 'Gorillas' - Inconsistent Passage

'Gorillas' - Inconsistent

1a. 1) Gorillas are big.
2) hairy (bushy, furry)
3) animals that live in the jungle

1b. Gorillas are strong animals.

2a. Gorillas/live together in small families/have small families/

2b. There is a mother, father and a baby gorilla in a family (that live together, in a group).

3a. 1) During the day gorillas travel (go) from/place to place/across the country/
2) /looking (hunting) for food/during the day they look (hunt) for food/

3b. At night/gorillas look for a tree to sleep in/gorillas sleep in a tree/

4a. The mother and baby sleep (stay) in the tree.

4b. Father sleeps (stays) at the bottom of the tree.

5a. /Each night (all the time) the gorillas must look (find, pick, hunt for) a new (another, different) tree/they change trees each night/

5b. Gorillas/look at many trees before picking one to sleep in/they are fussy looking for trees/

6a. Gorillas/do not sleep in the same tree every night/ move from tree to tree/sleep in a different tree each night/

6b. Gorillas/return to (pick) the same tree every night/ sleep in the same tree every night/

7a. That is where (how) gorillas sleep at night.

7b. That's the story about gorillas.

_________ = Key information scored in children's recall.

( ) = Alternative acceptable wording to previous word.

/ / = Alternative acceptable phrase to previous phrase enclosed in slash marks.

Table E-4

Scoring Criteria and Examples of Scoring Criteria for Strategy Use Measures

Strategy Score	Definition	Example
0	child does not indicate any strategy	"nothing", "I can't remember."
1	child indicates s/he simply listened to the story	"I listened", "I listened to see if it made sense"
2	child indicates s/he thought (in the absense of evaluating the comprehensibility of the passage), tried to remember the story, used an imagery or rehearsal strategy, made comments or asked questions about the information that was presented	"I thought about it to see if it was true", "I tried to remember all the parts", I made pictures in my head", I said it over and over", "I never knew they did that"
3	child indicated that s/he thought about the story or sentences to see if they made sense (i.e., includes an evaluation component)	"I thought about the sentences and I thought they made sense", "It doesn't tell the opposite so it makes sense"
4	child states that s/he compared the sentences to determine if they made sense together (i.e., includes an evaluation component)	"I put the sentences side by side and they made sense together", "I compared them sentences and they made sense", "I said yes these sentences make sense together"

Strategy Score	Definition	Example
5	child indicates s/he would check back through all the parts of the story to determine if the whole story makes sense (i.e., includes an evaluation component)	"I thought of the other parts I heard and they all made sense", "I compared these sentences with those up there and they all made sense"
6	child indicates s/he compared sentence pairs to determine if they make sense together and then checked back through the story to assess whether the two sentences made sense with the other sentences in the story	"I compare the two sentences and if they make sense together. I think back to all the sentences I heard so far to see if the two sentences make sense with all the other sentences"
7	child indicates s/he would compare sentences and check back (i.e., as above) but also indicates s/he would use self-statements to guide performance	"first I say what am I suppose to do? and what is my plan? then I start?, "after I compare and check back I ask "Am I using my plan? to make sure I use my plan" "At the end I ask "How did I do?" to give myself a pat on the back."

APPDENIX F

Children's Strategy Explanation and Strategy Demonstration Scores

as a Function of Their Total Listening Comprehension Monitoring Scores

Table F-1

Number of Children in the Posttest Only Group Obtaining Various Strategy Explanation Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score	Strategy Explanation Score 7	6	5	4	3	2	1	0
4*						1		
3					2	1		
2					4	1	1	
1					3	3	1	
0					3	2	2	

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score	Strategy Explanation Score 7	6	5	4	3	2	1	0
4*				1	1		1	
3				1	2		1	
2					5	1	1	
1					2	2		1
0					4	1		

*perfect monitoring

Table F-2

Number of Children in the Story Exposure Group Obtaining Various Strategy Explanation Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Explanation Score

	7	6	5	4	3	2	1	0
4					1		1	
3						2	1	
2					3	1		
1					3	4	3	1
0					2	1	1	

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Explanation Score

	7	6	5	4	3	2	1	0
4					4		2	
3							1	
2					5			
1					3	3	3	
0					1	2		

Table F-3

Number of Children in the Appropriate Standard Group Obtaining Various Strategy Explanation Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Explanation Score

	7	6	5	4	3	2	1	0
4			1		5	1	1	
3				1	6	1	1	
2					1	2	1	
1						2	1	
0								

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Explanation Score

	7	6	5	4	3	2	1	0
4			1	1	8	2		
3					5	1		
2				1	1		1	
1						3		
0								

Table F-4

Number of Children in the Appropriate Standard + Story Exposure Group Obtaining Various Strategy Explanation Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Explanation Score

	7	6	5	4	3	2	1	0
4				3	3	4	1	
3					2			
2				1	1	1		
1					4	2	1	
0						1		

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Explanation Score

	7	6	5	4	3	2	1	0
4				3	1	2		
3		2		1	4	2		
2								
1					4	3		
0					1	1		

Table F-5

Number of Children in the Comprehension Monitoring Outcome Knowledge Group Obtaining Various Strategy Explanation Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Explanation Score

	7	6	5	4	3	2	1	0
4			3	1	8			
3			1		4			
2					2			
1					3			
0					2			

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Explanation Score

	7	6	5	4	3	2	1	0
4		2	1	2	5	1		
3					6			
2				1	6			
1								
0								

Table F-6

Number of Children in the Comparison Training Group Obtaining Various Strategy Explanation Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Explanation Score

	7	6	5	4	3	2	1	0
4				8				
3				9	1			
2				5				
1					1			
0								

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Explanation Score

	7	6	5	4	3	2	1	0
4				9	2			
3				6	1			
2			1	1	2			
1				1				
0								

Table F-7

Number of Children in the Comparison + Monitoring Training Group Obtaining Various Strategy Explanation Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Explanation Score

	7	6	5	4	3	2	1	0
4		15	1					
3		5	1			1		
2				1				
1								
0								

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Explanation Score

	7	6	5	4	3	2	1	0
4		4	2	2	1	1		
3		6	1					
2		2	2	1				
1		1						
0								

Table F-8

Number of Children in the Comparison + Monitoring + Self-Instruction Training Group Obtaining Various Strategy Explanation Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score	Strategy Explanation Score 7	6	5	4	3	2	1	0
4	4	9		1	1	1		
3	3	3				1		
2		1						
1								
0								

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score	Strategy Explanation Score 7	6	5	4	3	2	1	0
4	2	13	1		2	1		
3		4		1				
2								
1								
0								

Table F-9

Number of Children in the Posttest Only Group Obtaining Various Strategy Demonstration Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Demonstration Score

	6	5	4	3	2	1	0
4					1		
3				1	2		
2		1			5		
1					5		2
0				1	6		

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Demonstration Score

	6	5	4	3	2	1	0
4				1	2		
3				1	3		
2		1		3	3		
1					4		1
0				2	3		

Table F-10

Number of Children in the Story Exposure Group Obtaining Various Strategy Demonstration Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score	Strategy Demonstration Score: 6	5	4	3	2	1	0
4					1	1	
3					2	1	
2					3	1	
1					7	1	3
0					3		1

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score	Strategy Demonstration Score: 6	5	4	3	2	1	0
4					5	1	
3					1		
2				1	4	1	
1				1	5	2	
0					3		

Table F-11

Number of Children in the Appropriate Standard Group Obtaining Various Strategy Demonstration Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Demonstration Score

	6	5	4	3	2	1	0
4				3	5		
3				3	5		1
2		1			2	1	
1					3		
0							

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Demonstration Score

	6	5	4	3	2	1	0
4				7	5		
3				2	3	1	
2				2	1		
1					3		
0							

Table F-12

Number of Children in the Appropriate Standard + Story Exposure Group Obtaining Various Strategy Demonstration Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Demonstration Score

	6	5	4	3	2	1	0
4			1	2	8		
3		1			1		
2			1		2		
1					7		
0					1		

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Demonstration Score

	6	5	4	3	2	1	0
4		3		2	1		
3		1	2	3	3		
2							
1				1	6		
0				1	1		

Table F-13

Number of Children in the Comprehension Monitoring Outcome Knowledge Group Obtaining Various Strategy Demonstration Scores as a Function of Their Total Listening Comprehension Monitoring Scores

IMMEDIATE MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Demonstration Score

	6	5	4	3	2	1	0
4		1	1	4	6		
3		1		1	3		
2			1				1
1					3		
0					2		

DELAYED MAINTENANCE

Total Listening Comprehension Monitoring Score

Strategy Demonstration Score

	6	5	4	3	2	1	0
4		4	3	1	3		
3				1	5		
2				2	4		1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]